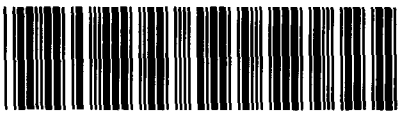

Control Number: 48787

Item Number: 2

Addendum StartPage: 0

JOINT APPLICATION OF LCRA TRANSMISSION SERVICES CORPORATION AND AEP TEXAS INC TO AMEND THEIR CERTIFICATES OF CONVENIENCE AND NECESSITY FOR THE PROPOSED BAKERSFIELD TO SOLSTICE 345-KV TRANSMISSION LINE PROJECT IN PECOS COUNTY, TEXAS

DOCKET NO. 48787

Submit seven (7) copies of the application and all attachments supporting the application. If the application is being filed pursuant to 16 Tex. Admin. Code § 25.101(b)(3)(D) (TAC) or 16 TAC § 25.174, include in the application all direct testimony. The application and other necessary documents shall be submitted to:

Public Utility Commission of Texas
Attn: Filing Clerk
1701 N. Congress Ave.
Austin, Texas 78711-3326

2

Applicants LCRA Transmission Services Corporation (LCRA TSC) and AEP Texas Inc. (AEP Texas) are filing this application as Joint Applicants and request that all parties serve copies of all pleadings, discovery, correspondence, and other documents on the following representatives:

Service Contacts:

Kirk Rasmussen
State Bar No. 24013374
Enoch Kever PLLC
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Attorney for LCRA TSC

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State Bar No. 24004709
AEP Service Corp.
400 W. 15th Street, Suite 1520
Austin, Texas 78701
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jnhuerta@aep.com
Attorney for AEP Texas

Note: As used herein, the term "joint application" refers to an application for proposed transmission facilities for which ownership will be divided. All applications for such facilities should be filed jointly by the proposed owners of the facilities.

1. **Applicant (Utility) Name:**
For Joint applications, provide all information for each applicant.

Applicant (Utility) Name:	LCRA Transmission Services Corporation (LCRA TSC)
Certificate Number:	30110
Street Address:	3700 Lake Austin Boulevard Austin, TX 78703
Mailing Address:	P.O. Box 220 Austin, TX 78767-0220
Applicant (Utility) Name:	AEP Texas Inc. (AEP Texas)
Certificate Number:	30170[1]
Street Address:	539 North Carancahua Corpus Christi, TX 78401
Mailing Address:	539 North Carancahua Corpus Christi, TX 78401

2. **Please identify all entities that will hold an ownership interest or an investment interest in the proposed project but which are not subject to the Commission's jurisdiction.**

Not applicable. LCRA TSC and AEP Texas will hold separate 50 percent ownership interests in the Bakersfield to Solstice 345-kV Transmission Line Project. No entity not subject to the Commission's jurisdiction will hold an ownership or investment interest in the project.

[1] Certificate Number 30170 was assigned to AEP Texas North Company, which with AEP Texas Central Company, merged with their immediate parent company AEP Utilities, Inc. effective December 31, 2016. The merger was approved by the Public Utility Commission of Texas on December 1, 2016 in PUC Docket No. 46050; SOAH Docket No. 473-16-4822 — *Application of AEP Texas Central Company, AEP Texas North Company, and AEP Utilities, Inc. for Approval of Merger.* As of January 2017, the merged company is doing business as AEP Texas Inc.

3. **Person to Contact:**
For joint applications, provide all information for each applicant.

Contact for LCRA TSC:	Sonya Strambler
Title/Position:	Regulatory Case Manager
Phone Number:	(512) 578-1856
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Contact for AEP Texas:	Randal E. Roper, PE
Title/Position:	Regulatory Case Manager
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Mailing Address:	400 W. 15th Street, Suite 1520 Austin, Texas 78701
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Legal Counsel - LCRA TSC:	Kirk Rasmussen
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Legal Counsel - AEP Texas:	Jerry Huerta
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Email Address:	jnhuerta@aep.com
	Kerry McGrath (512) 744-9300 Duggins Wren Mann & Romero, LLP 600 Congress Avenue, 19th Floor Austin, Texas 78701 kmcgrath@dwmrlaw.com

4. **Project Description:**
Name or Designation of Project

Bakersfield to Solstice 345-kV Transmission Line Project in Pecos County, Texas (Project)

Provide a general description of the project, including the design voltage rating (kV), the operating voltage (kV), the CREZ Zone(s) (if any) where the project is located (all or in part), any substations and/or substation reactive compensation constructed as part of the project, and any series elements such as sectionalizing switching devices, series line compensation, etc. For HVDC transmission lines, the converter stations should be considered to be project components and should be addressed in the project description.

The Proposed Transmission Line Project is located within Pecos County, Texas. The LCRA TSC Bakersfield Station is located approximately six miles north of Interstate Highway 10 (IH-10) and one mile west of Farm-to-Market Road 1901 (FM 1901). The AEP Texas Solstice Switch Station is located along IH-10 approximately 29 miles west of the City of Fort Stockton and near Hovey Road.

The Project will be designed, constructed, and operated as a double-circuit 345-kV transmission line connecting the Bakersfield and Solstice stations.

A portion of the Project is located within the McCamey CREZ Zone. HVDC facilities are not included as part of the project scope.

If the project will be owned by more than one party, briefly explain the ownership arrangements between the parties and provide a description of the portion(s) that will be owned by each party. Provide a description of the responsibilities of each party for implementing the project (design, Right-Of-Way acquisition, material procurement, construction, etc.).

LCRA TSC and AEP Texas will each own 50 percent of the Project. LCRA TSC will construct, own, operate, and maintain the eastern half of the transmission line connecting to LCRA TSC's Bakersfield Station (including all necessary construction within the Bakersfield Station) and AEP Texas will construct, own, operate, and maintain the western half of the transmission line connecting to AEP Texas' Solstice Switch Station (including all necessary construction to expand the Solstice Switch Station to terminate the Project). The AEP Texas Solstice Switch Station is currently a 138-kV station and will be expanded for a 345-kV station yard in a ring bus configuration. The new 345-kV station will be interconnected to the 138-kV station through two 600 MVA 345/138-kV autotransformers and a 50 Mvar reactor in conjunction with the Project will be added in the expanded station.

The dividing point of the Project will be determined following the Public Utility Commission of Texas' (PUC or Commission) approval of the final transmission line route. The structure closest to the middle of the approved route will be a deadend structure owned by AEP Texas. LCRA TSC's ownership will extend from the east to the point at which its conductors connect to AEP Texas' deadend structure. LCRA TSC will own, operate, and maintain all transmission line facilities, including conductors, wires, structures, hardware, and easements of the eastern half of the transmission line connecting to the Bakersfield Station and AEP Texas will own, operate, and maintain all transmission line facilities, including conductors, wires, structures, hardware, and easements of the western half of the transmission line connecting to the Solstice Switch

Station. Each utility will be responsible for their respective portions of the Project, including design, right-of-way (ROW) acquisition, material procurement, construction, etc.

If applicable, identify and explain any deviation in transmission project components from the original transmission specifications as previously approved by the Commission or recommended by a PURA §39.151 organization.

In June 2017, the Board of Directors of the Electric Reliability Council of Texas (ERCOT) (a Public Utility Regulatory Act (PURA) § 39.151 organization) endorsed construction of the Project as a double-circuit capable 345-kV transmission line with an initial single circuit installed from Bakersfield to Solstice. In June 2018, in response to accelerating and increasing demand growth in the region, the ERCOT Board of Directors endorsed expanding the Project to include installation of the second circuit at the time of construction and determined that the Project was critical to the reliability of the ERCOT system. This Application reflects the changes to the specifications for the Project approved by the ERCOT Board of Directors in June 2018. The ERCOT recommendations are included as part of Attachment 2 to the Application.

5. **Conductor and Structures**

Conductor Size and Type:	1926.9 kcmil ACSS/Cumberland (LCRA TSC) and 1590 ACSS (AEP Texas)
Number of conductors per phase:	Two (2) conductors per phase
Continuous Summer Static Current Rating (A):	Minimum 4,288 A
Continuous Summer Static Line Capacity at Operating Voltage (MVA):	2,564 MVA at 345-kV
Continuous Summer Static Line Capacity at Design Voltage (MVA):	2,564 MVA at 345-kV
Type and Composition of Structures:	Double-circuit steel lattice towers
Height of Typical Structures:	110 to 185 feet above the ground

Explain why these structures were selected; include such factors as landowner preference, engineering considerations, and costs comparisons to alternate structures that were considered. Provide dimensional drawings of the typical structures to be used in the project.

LCRA TSC and AEP Texas selected 345-kV lattice towers as the proposed structure type for the Project based primarily on cost,[2] efficiency,[3] and the other factors discussed in the Direct Testimony and Exhibit of Mr. Curtis Symank that are being filed concurrent with the Application. LCRA TSC and AEP Texas considered spun concrete poles, tower poles, tubular steel poles, and lattice towers as possible structures for the Project. Please refer to Figures 1-3 through 1-5 in the *Bakersfield to Solstice 345-kV Transmission Line Project Environmental Assessment and Alternative Route Analysis, Pecos County* (EA), included as Attachment 1 to the Application, for dimensional drawings of the typical structures proposed to be used by LCRA TSC and AEP Texas for the Project.

For joint applications, provide and separately identify the above-required information regarding structures for the portion(s) of the project owned by each applicant.

AEP Texas and LCRA TSC will each use the same type of structures, discussed above, for their portion of the Project.

6. **Right-of-way:**
Miles of Right-of-Way:

Approximately 68 to 92 total miles of Right-of-Way.

Miles of Circuit:

The Project is double-circuit, therefore, the project will result in approximately 130 to 190 miles of circuit.

Width of Right-of-Way:

Typical ROW for the Project will be 150 feet in width.

[2] Structure costs considered included the total installed cost of each structure including purchase, delivery, installation (including foundations), and the installed cost of hardware.

[3] For example, the weight of the structure and of structural steel.

Percent of Right-of-Way Acquired:

Zero.

For joint applications, provide and separately identify the above-required information for each route for the portion(s) of the project owned by each applicant.

During or after the hearing on the merits, Applicants will provide specific details about the estimated structure location of ownership transition for the routes under primary consideration at that juncture of the application process.

Provide a brief description of the area traversed by the transmission line. Include a description of the general land uses in the area and the type of terrain crossed by the line.

The Project will connect the existing LCRA TSC Bakersfield Station to the existing AEP Texas Solstice Switch Station. The Project area is located within Pecos County, Texas and includes the City of Fort Stockton.

The Project area is primarily rural with a variety of scattered land uses including commercial and residential development, transportation facilities, parks and recreation areas, rural agricultural areas, oil and gas developments, and wind energy production.

The Project area is situated within the southern portion of the High Plains, the northwest portion of the Edwards Plateau, and the southeast portion of the Basin and Range physiographic region of Texas. The southern High Plains region is described as nearly flat with playa lakes and local dune fields with elevations ranging from 2,200 feet to 3,800 feet above mean sea level (amsl). The Edwards Plateau region is described as a flat upper surface with box canyons with elevations ranging from 450 feet to 3,000 feet amsl. The Basin and Range region is characterized by north and south facing mountains and basins with elevations ranging from 1,700 feet to 8,750 feet amsl. Elevations in the study area range between approximately 2,300 feet amsl near the Pecos River in the northeast portions of the study area to approximately 3,600 feet on the hilltops and mesas in the southern portions of the study area.

Specific discussion regarding natural, human, and cultural resources in the Project area is set forth in the EA, Section 2.0.

7. **Substations or Switching Stations:**

List the name of all existing HVDC converter stations, substations or switching stations that will be associated with the new transmission line. Provide documentation showing that the owner(s) of the existing HVDC converter stations, substations and/or switching stations have agreed to the installation of the required project facilities.

List the name of all new HVDC converter stations, substations or switching stations that will be associated with the new transmission line. Provide documentation showing that the owner(s) of the new HVDC converter stations, substations and/or switching stations have agreed to the installation of the required project facilities.

There are no existing or new HVDC converter stations associated with the Project. The eastern portion of the transmission line Project will terminate at LCRA TSC's existing 345-kV Bakersfield Station. The western portion of the transmission line Project will terminate at AEP Texas' existing Solstice Switch Station. The AEP Texas Solstice Switch Station is currently a 138-kV station and will be expanded to a 345-kV station yard adjacent to the 138-kV station.

8. **Estimated Schedule:**

Estimated Dates of:	Start	Completion
Right-of-way and Land Acquisition	May 2019 (LCRA TSC) May 2019 (AEP Texas)	October 2019 (LCRA TSC) October 2019 (AEP Texas)
Engineering and Design	June 2019 (LCRA TSC) May 2019 (AEP Texas)	November 2019 (LCRA TSC) December 2019 (AEP Texas)
Material and Equipment Procurement	December 2018 (LCRA TSC) June 2019 (AEP Texas)	February 2020 (LCRA TSC) February 2020 (AEP Texas)
Construction of Facilities	December 2019 (LCRA TSC) January 2020 (AEP Texas)	December 2020 (LCRA TSC) December 2020 (AEP Texas)
Energize Facilities	-	December 2020 (LCRA TSC) December 2020 (AEP Texas)

9. **Counties:**

For each route, list all counties in which the route is to be constructed.

All routes and route segments filed in this application are located in Pecos County, Texas.

Please refer to Figures 3-13, 3-14 (Appendix D), and 4-1 (Appendix E) in the EA for the location of alternative route segments.

10. Municipalities:

For each route, list all municipalities in which the route is to be constructed.

None of the alternative routes in this application will be constructed within the incorporated limits or ETJ of any municipality.

For each applicant, attach a copy of the franchise, permit or other evidence of the city's consent held by the utility, if necessary or applicable. If franchise, permit, or other evidence of the city's consent has been previously filed, provide only the docket number of the application in which the consent was filed. Each applicant should provide this information only for the portion(s) of the project which will be owned by the applicant.

Not applicable.

11. Affected Utilities:

Identify any other electric utility served by or connected to facilities in this application.

Other utilities connected at LCRA TSC's Bakersfield Station include Electric Transmission Texas (ETT), South Texas Electric Cooperative (STEC), and the City of Garland.

No other utilities connected at AEP Texas' Solstice Switch Station at the time of this application.

Oncor Electric Delivery Company and AEP Texas are simultaneously filing a CCN application for the Sand Lake to Solstice 345-kV transmission line (PUC Docket No. 48785), which will connect to the Solstice Switch Station.

Describe how any other electric utility will be affected and the extent of the other utilities' involvement in the construction of this project. Include any other electric utilities whose existing facilities will be utilized for the project (vacant circuit positions, ROW, substation sites and/or equipment, etc.) and provide documentation showing that the owner(s) of the existing facilities have agreed to the installation of the required project facilities.

No other electric utility will be involved in the construction of the Project. No other utilities' existing facilities will be utilized for the Project.

12. **Financing:**

Describe the method of financing this project. For each applicant that is to be reimbursed for all or a portion of this project, identify the source and amount of the reimbursement (actual amount if known, estimated amount otherwise) and the portion(s) of the project for which the reimbursement will be made.

LCRA TSC will finance its portion of the Project similar to that which has been used for projects previously constructed by LCRA TSC. Financing may include a combination of tax-exempt commercial paper, tax-exempt private revolving note, or taxable commercial paper, and, subsequent to project completion, fixed-rate debt. Interest on the debt may be capitalized until the Project is in service, at which point it is intended that both the principal and interest will be serviced with Transmission Cost of Service revenues.

AEP Texas will finance its portion of the Project similar to that which has been used for projects previously constructed by AEP Texas. Financing will include a combination of short-term borrowings and owner equity.

13. **Estimated Costs: Provide cost estimates for each route of the proposed project using the following table. Provide a breakdown of "Other" costs by major cost category and amount. Provide the information for each route in an attachment to this application.**

	Transmission Facilities *	**Substation Facilities ***
Right-of-way and Land Acquisition	-	-
Engineering and Design (Utility)	-	-
Engineering and Design (Contract)	-	-
Procurement of Material and Equipment (including stores)	-	-
Construction of Facilities (Utility)	-	-
Construction of Facilities (Contract)	-	-
Other (all costs not included in the above categories)	-	-
Estimated Total Cost	See Attach. 3	See Attach. 3

*Please refer to Attachment 3 to this Application for Transmission and Station Facilities estimated costs for each alternative route presented in this Application.

For joint applications, provide and separately identify the above-required information for the portion(s) of the project owned by each applicant.

The cost estimates presented in Attachment 3 represent a reasonable estimate of the costs for the transmission facilities portion of the Project. The per mile costs for constructing the transmission line portion of the Project (e.g., materials, labor, ROW) will be very similar for LCRA TSC and AEP Texas. In preparing the cost estimates for each route, AEP Texas and LCRA TSC did not attempt to separate costs by utility. AEP Texas and LCRA TSC will each be responsible for construction of 50 percent of the transmission line portion of the Project. The station costs for each utility are presented separately in Attachment 3.

14. **Need for the Proposed Project:**

For a standard application, describe the need for the construction and state how the proposed project will address the need. Describe the existing transmission system and conditions addressed by this application. For projects that are planned to accommodate load growth, provide historical load data and load projections for at least five years. For projects to accommodate load growth or to address reliability issues, provide a description of the steady state load flow analysis that justifies the project. For interconnection projects, provide any documentation from a transmission service customer, generator, transmission service provider, or other entity to establish that the proposed facilities are needed. For projects related to a Competitive Renewable Energy Zone, the foregoing requirements are not necessary; the applicant need only provide a specific reference to the pertinent portion(s) of an appropriate commission order specifying that the facilities are needed. For all projects, provide any documentation of the review and recommendation of a PURA §39.151 organization.

The Project and associated station work was reviewed by stakeholders and endorsed by the Electric Reliability Council of Texas ("ERCOT") through the ERCOT Regional Planning Group ("RPG") project review process, as part of the Far West Texas Project and the Far West Texas 2 Project. ERCOT performed power flow studies as part of the ERCOT RPG process and found voltage and thermal violations under the North American Electric Reliability Corporation ("NERC") Standard TPL-001-4 reliability criteria. ERCOT recommended the Project as one of the components that would provide the most effective solution to meet reliability needs and provide infrastructure to accommodate future load growth. The Project has also received approval by both the ERCOT Technical Advisory Committee ("TAC") and the ERCOT Board of Directors. See Far West Texas Project ERCOT Endorsement Letter dated June 2017 and Independent Review dated May 2017 included as Attachment 2a. Also see Far West Texas 2 Project ERCOT Endorsement Letter dated June 2018 and Independent Review dated May 2018 included as Attachment 2d.

The electric utilities principally serving load in West Texas—Oncor, AEP Texas, and Texas New Mexico Power—continue to experience load growth in their respective service areas due to oil and natural gas production, mid-stream processing, and associated economic expansion in the area referred to as the Delaware Basin. In order to meet this need, a new transmission line (Sand Lake to Solstice 345-kV Electric Transmission Line Project; PUC Doc. No. 48785) in Pecos, Reeves, and Ward Counties is being proposed by

Oncor and AEP Texas to connect Oncor's Sand Lake Switch, located in Ward County, to AEP Texas' Solstice Switch, located in Pecos County. In addition to the Sand Lake to Solstice Project, LCRA TSC and AEP Texas are proposing to construct the transmission line included in this Application (Bakersfield to Solstice 345-kV Electric Transmission Line) to meet the needs of the region. See Figure 1 below for the locations of these stations.

Pecos, Reeves, and Ward Counties lie within the West Texas region of the Delaware Basin where deep underground shale deposits referred to as "plays" are providing opportunities for oil and natural gas exploration and production. Improvements in oil and natural gas exploration technologies have increased activity in the area and resulted in electric load growth at substations within the Delaware Basin. This growth has resulted in increased load served on Oncor's existing Wink – Culberson Switch 138-kV Line and Yucca Drive Switch – Culberson Switch 138-kV Lines (referred to as "The Culberson Loop"). Additionally, this growth has resulted in increased load on AEP Texas' 138 kV lines exiting Solstice Switch (referred to as "The Barilla Junction Area"). See Figure 1 below for the locations of these lines.

This rapid load growth threatens transmission reliability in the area. Oncor identified numerous contingencies that resulted in unacceptable voltage conditions along The Culberson Loop transmission lines. Studies showed that multiple NERC TPL-001-4 contingences would result in unsolved contingencies during load flow analysis. The unsolved contingencies show an inability of the power system to maintain acceptable voltages following a disturbance, resulting in potential voltage collapse along these lines. Such scenarios could cause all customers served from these lines to be dropped. Additionally, AEP Texas identified numerous contingencies that resulted in thermal violations along The Barilla Junction Area transmission lines. These violations are an indication that the current capacity of existing transmission lines in the area is insufficient and that loading can exceed their existing ratings.

Ultimately Oncor and AEP Texas determined that a strong source, which a new 345-kV injection provides, is required to support voltage conditions and line loading in the area, especially as load continues to grow. As a result, Oncor and AEP Texas proposed the Far West Texas Project to the ERCOT RPG, which included a new 345-kV transmission loop between Odessa EHV to Moss to Riverton to Sand Lake to Solstice to Bakersfield stations. See Attachment 2b for the Oncor and AEP Texas Far West Texas Project RPG Submittal report.

As part of the original Far West Texas Project, ERCOT saw similar concerns and confirmed the need for 345-kV facilities in the project study area. ERCOT recommended the establishment of a new 345-kV transmission line between the Riverton and Odessa EHV Switch stations, and a new 345-kV transmission line between the Solstice and Bakersfield stations. For details of ERCOT's analysis and recommendations in the original Far West Texas Project, please see ERCOT's June 2017 Endorsement Letter and Independent Review dated May 2017 included as Attachment 2a.

ERCOT also indicated the potential need for future improvements as load grows in the area, including future 345-kV circuits between Riverton and Sand Lake, as well as Sand Lake and Solstice. This 345-kV line segment from Riverton to Sand Lake to Solstice was part of the original Far West Texas Project proposal; however, ERCOT did not initially

approve construction of all these segments as part of its independent review. ERCOT recommended that the need for these circuits be re-evaluated when confirmed load projections on The Culberson Loop reached 717 MW.

Table 1 below shows the sum of historical and projected summer peak loads (MW) for the substations on The Culberson Loop transmission lines. The loads from 2013 to 2017 are actual non-coincident summer peaks. The load for 2018 is the projected peak, expected to occur between the last date the forecast was updated and the end of the year, and only includes confirmed load increases for Oncor substations and customer requests that have signed agreements for service. The loads for 2019 to 2023 are projected non-coincident summer peaks and only include confirmed load increases for Oncor substations and customer requests that have signed agreements for service.

	Historical Load					Projected Load					
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total (MW)	48.5	81.7	93.7	205.4	246.4	771	902	1318	1475	1549	1597

Table 1 - Historical and Projected Load on the Wink – Culberson and Yucca Drive – Culberson 138-kV Transmission Lines

Table 2 below was provided by AEP Texas and shows historical and projected summer peak loads (MW) in The Barilla Junction Area for the same period. The jump in the projected load in 2019 is the result of new oil field activity underway and load request that was not projected when the Far West Texas Project submission was made.

	Historical Load					Projected Load					
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total (MW)	278.4	271.8	322.8	312.5	396.6	458	672	886	1010	1061	1075

Table 2 - Historical and Projected Load The Barilla Junction Area

With future load additions, Oncor's steady state contingency analysis shows that loss of the future radial Odessa EHV – Riverton 345 -kV Line, a NERC category P1.2 contingency, results in multiple voltage violations along The Culberson Loop as load grows along these lines in future years. The result indicates that a single-line outage of the radial 345-kV transmission line will result in a service interruption to all customers served within The Culberson Loop. This analysis also indicates that taking a clearance on the radial 345-kV line will be problematic.

As a result, Oncor, in coordination with AEP Texas and LCRA TSC, proposed the Far West Texas Project 2 to the ERCOT RPG, which included the Riverton to Sand Lake and Sand Lake to Solstice 345-kV Lines and the initial installation of the second circuit on the Bakersfield to Solstice 345-kV Line. These projects would provide bidirectional service for the 345-kV source into The Culberson Loop, ultimately addressing the criteria violations mentioned previously. See Attachment 2c for the Oncor Far West Texas Project 2 RPG Submittal report. ERCOT's independent review confirmed the reliability need to expand the 345-kV transmission system in the region. Constructing the Bakersfield to Solstice and

Sand Lake to Solstice 345-kV lines will be components to allow bidirectional flow in the area on the new 345-kV lines, ultimately allowing voltage support from the stronger 345-kV injection to address reliability concerns in the region such as the single-line outage of a radial 345-kV line. In addition, this would improve: operational flexibility during emergency conditions, obtaining clearances for maintenance of equipment, and connecting new loads to the system.

On June 12, 2018, the ERCOT Board of Directors endorsed the recommendation of the Independent Review recommending transmission improvements, including the components of the Project that are the subject of this application. See ERCOT Endorsement Letter dated June 2018 and Independent Review dated May 2018 included as Attachment 2d.

Critical Designation

In May 2018, Oncor, AEP Service Company (AEPSC) on behalf of AEP Texas, and LCRA TSC submitted a formal request to ERCOT to grant critical designation status for the Riverton – Sand Lake, the Sand Lake – Solstice, and the Bakersfield – Solstice 345-kV Double-Circuit Lines, pursuant to 16 Texas Administrative Code § 25.101 (b)(3)(D). See letter dated May 14, 2018 included as Attachment 2e.

In the request, the companies described the acceleration of load growth being experienced in the region and the criticality of 345-kV service to the reliability of the area. Load growth in the area has surpassed ERCOT's expected load serving capability for existing planned projects in the area.

On June 12, 2018, the ERCOT Board of Directors designated the Riverton - Sand Lake 345 kV line, the Sand Lake - Solstice 345 kV and the Bakersfield – Solstice Double-Circuit 345 kV lines critical to the reliability of the ERCOT System. See ERCOT Board of Directors' resolution included as Attachment 2f.

ERCOT's endorsement and critical designation confirms the multiple operational and reliability needs for the Project, and highlights the necessity for the 345-kV facilities to be placed in-service as soon as possible.

Supplemental Information

On October 15, 2018, ERCOT identified the completion of the 345-kV components of the Far West Texas Project and the Far West Texas Project 2 that complete a transmission path from Bakersfield to Solstice to Sand Lake to Riverton to Odessa EHV as the exit strategy for a Generic Transmission Constraint established for the McCamey area. See Attachment 2g.

15. Alternatives to Project:

For a standard application, describe alternatives to the construction of this project (not routing options). Include an analysis of distribution alternatives, upgrading voltage or bundling of conductors of existing facilities, adding transformers, and for utilities that have not unbundled, distributed generation as alternatives to the project. Explain how the project overcomes the insufficiencies of the other options that were considered.

Alternatives to the Project were studied as part of the ERCOT RPG process in both the Far West Texas Project and the Far West Texas Project 2.

Far West Texas Project

In ERCOT's independent review of the Far West Texas Project, ERCOT reviewed 40 different alternatives. The alternatives included numerous variations of different 138-kV and 345-kV transmission lines and reactive compensation devices. Additionally, ERCOT examined various termination points for new transmission lines and new reactive compensation. Ultimately ERCOT narrowed down the alternatives to four main options for detailed study.

Option 1:

- Install a new 200 MVAR Dynamic Synchronous Condenser at Mentone 138-kV Substation.
- Install a new 200 MVAR Dynamic Synchronous Condenser at Culberson 138-kV Substation.
- Construct a new approximately 85-mile 345-kV line operating at 138-kV on double-circuit structures with one circuit in place, between Moss and Riverton Switch stations.
- Add a second circuit to the existing 16-mile Moss Switch station – Odessa EHV 345-kV double-circuit structures. Connect the new circuit from Riverton Switch station and terminate at Odessa EHV to create the new Odessa EHV - Riverton 345-kV line operating at 138-kV.
- Build a new McCamey – Fort Stockton 345-kV double circuit line operating at 138-kV (requiring approximately 47-miles of new right of way).
- Build a new Pig Creek – Fort Stockton 345-kV single circuit line operating at 138-kV (requiring approximately 39-miles of new right of way).
- Install a new 50 MVAR capacitor bank each at Mentone and Salt Creek 138-kV Substations.
- Install a new 18 MVAR capacitor bank each at Orla, Elmar, Loving and Alamito Creek 138-kV Substations.
- Install a new 3.6 MVAR capacitor bank at Espy Wells 69 kV Substation.
- Install a new 10.8 MVAR capacitor bank at Shafter Goldmine 69 kV Substation.
- Install a new 7.2 MVAR capacitor bank at Sanderson TNP 69 kV Substation.

The total cost estimate for Option 1 is approximately $464 Million.

Option 2:

- Expand the Riverton Switch station to install a 345-kV ring-bus arrangement with two 600 MVA, 345/138-kV autotransformers.
- Construct a new approximately 85-mile 345-kV line on double-circuit structures with one circuit in place, between Moss and Riverton Switch stations. Add a second circuit to the existing 16-mile Moss Switch – Odessa EHV 345-kV double-circuit structures. Install 345-kV circuit breaker(s) at Odessa EHV. Connect the new circuit from Riverton Switch station and terminate at Odessa EHV to create the new Odessa EHV – Riverton 345-kV Line.
- Expand the Solstice Switch station to install a 345-kV ring-bus arrangement with two 600 MVA, 345/138-kV autotransformers.
- Construct a new approximately 68-mile 345-kV line from Solstice Switch station to Bakersfield station on double-circuit structures with one circuit in place.

The total cost estimate for Option 2 is approximately $336 Million.

Option 3:

- Expand the Riverton Switch station to install a 345-kV ring-bus arrangement with two 600 MVA, 345/138-kV autotransformers.
- Construct a new approximately 85-mile 345-kV line on double-circuit structures with one circuit in place, between Moss and Riverton Switch stations. Add a second circuit to the existing 16-mile Moss Switch – Odessa EHV 345-kV double-circuit structures. Install 345-kV circuit breaker(s) at Odessa EHV. Connect the new circuit from Riverton Switch station and terminate at Odessa EHV to create the new Odessa EHV – Riverton 345-kV Line.
- Expand the Riverton Switch station to install a 345-kV ring-bus arrangement with two 600 MVA, 345/138-kV autotransformers.
- Expand the Sand Lake Switch station to install a 345-kV ring-bus arrangement with one 600 MVA, 345/138-kV autotransformer.
- Expand the Solstice Switch station to install a 345-kV ring-bus arrangement with two 600 MVA, 345/138-kV autotransformers.
- Construct a new approximately 41-mile 345-kV line on double-circuit structures with one circuit in place, Sand Lake – Solstice 345-kV single circuit line (the proposed transmission line).
- Add a second circuit to the Riverton – Mentone – Sand Lake 345-kV to create a Riverton – Sand Lake 345-kV line on the existing Riverton – Mentone – Sand Lake 345-kV line operating at 138-kV.
- Construct a new approximately 68-mile 345-kV line from Solstice Switch to Bakersfield on double-circuit structures with one circuit in place.

The total cost estimate for Option 3 is approximately $446 Million.

Option 4:

- Option 4 is same as Option 3 with an additional new 200 MVAR Synchronous Condenser at Culberson 138-kV Substation.

The total cost estimate for Option 4 is approximately $501 Million.

ERCOT's analysis indicated that all of the four options addressed the reliability needs in The Culberson Loop with the projected load conditions at the time of the submittal in 2016. Oncor provided additional information to ERCOT for additional loads not yet under contract as of the study date, but which were known to want service in the near future. ERCOT used this information for their sensitivity study in which they found that all NERC criteria violations could not be addressed by Options 1 and 2. Options 3 and 4 showed no violations even under the sensitivity study scenario.

ERCOT endorsed Option 2, which included a variation of the Project (a 345-kV transmission line between Bakersfield and Solstice as double-circuit capable with a single circuit installed initially), as the best solution to address the reliability needs of the region. Ultimately elements of Option 3 and 4, were later endorsed by ERCOT through its independent review of the Far West Texas Project 2.

Far West Texas Project 2

In ERCOT's independent review of the Far West Texas Project 2, ERCOT revisited the alternatives and approved project elements from the initial Far West Texas Project based on new load additions in the region. ERCOT narrowed down a shortlist of "universal" transmission upgrades as part of its alternatives development in order to align with the expansion options from its original analysis of the Far West Texas Project.

The "universal" options included:

- Construct a new approximately 40-mile 345-kV line on double-circuit structures with two circuits in place from Sand Lake 345-kV Switch to Solstice 345-kV Switch.
- Add two new 600 MVA, 345/138-kV autotransformers at Sand Lake 345-kV Switch station.
- Install a new 345-kV circuit on the planned Riverton – Sand Lake double circuit structures.
- Install the second 345-kV circuit on the Odessa EHV – Riverton 345-kV line double circuit structures between Moss and Riverton (creating a Moss – Riverton 345-kV circuit).
- Construct a new Quarry Field 138-kV Switch station in the Wink – Riverton double-circuit 138-kV line.
- Construct a new approximately 20-mile Kyle Ranch – Riverton 138-kV line on double-circuit structures with one circuit in place from Kyle Ranch 138-kV Substation to Riverton 138-kV Switch station.
- Construct a new approximately 20-mile Owl Hills – Tunstill – Riverton 138-kV line on double circuit structures with one circuit in place from Owl Hills 138-kV Substation to Riverton 138-kV Switch station.
- Install the second 345-kV circuit on the planned Solstice Switch – Bakersfield Switch double circuit structures.

Using these "universal" upgrades in each of the final options, ERCOT further studied three final options.

Option 1:

- Install two 250 MVAR Static Synchronous Compensators at Horseshoe Springs 138-kV Switch station.

The total cost estimate for Option 1 is approximately $300.0 Million.

Option 2:

- Install one 250 MVAR Static Synchronous Compensator ("STATCOM") at Horseshoe Springs 138-kV Switch station.
- Install capacitor banks with a total capacity of 150 MVAR at Horseshoe Springs 138-kV Switch station.
- Install capacitor banks with a total capacity of 150 MVAR at Quarry Field 138-kV Switch station.

The total cost estimate for Option 2 is approximately $292.5 Million.

Option 3:

- Install one 250 MVAR STATCOM at Horseshoe Springs 138-kV Switch station.
- Install one 250 MVAR STATCOM at Quarry Field 138-kV Switch station.
- Install capacitor banks with a total capacity of 150 MVAR at Horseshoe Springs 138-kV Switch station.
- Install capacitor banks with a total capacity of 150 MVAR at Quarry Field 138-kV Switch station.

The total cost estimate for Option 3 is approximately $446.0 Million.

ERCOT's analysis indicated that all three options addressed the reliability needs in The Culberson Loop with the projected future load conditions. ERCOT ultimately recommended Option 3 as the option with the best load serving capability to accommodate both near-term and potential future load needs in the area.

The Bakersfield Station was chosen as an end point for the Project because Bakersfield is the strongest and main 345-kV source in the area through existing 345-kV transmission line connections to the Odessa EHV substation the north and Big Hill substation to the east. Weaker sources would not provide the appropriate voltage support to the underlying 138-kV system in the area where the reliability violations have been identified. There are no other feasible 345-kV facilities in the area, so Bakersfield is the best location to interconnect to the 345-kV transmission system for a strong voltage source. The existing 345-kV line from Bakersfield to the Odessa EHV Switch, when considered with the improvements contained in the Project, creates a 345-kV transmission loop to provide support to the load growth in west Pecos County and along the Culberson Loop. Creating the bi-directional looped service capability for the 345-kV system in the area is needed to meet the reliability and operational flexibility required for existing and future customers.

The Solstice Switch Station was chosen as an end point for the Project because of its ideal location for electrical connection. At the Solstice and the adjacent Barilla Junction stations, there are terminations of eight different transmission circuits with connections to major switch stations for the region, including Pig Creek/Yucca Drive, Fort Stockton Switch, and Fort Stockton Plant. All lines and customers served from these lines would benefit from the new 345-kV source. Since Solstice Switch is a major 138-kV transmission hub within Pecos County, all of these transmission lines and customers served from these lines would benefit from the future 345-kV injection. Solstice is also the end point for the planned Sand Lake – Solstice 345-kV Line. A different endpoint from Solstice would not take advantage of the already planned project to bring 345-kV facilities to the area.

Distribution alternatives are not practical alternatives since they would not improve the reliability and operational capability of the transmission system in the area.

Upgrading voltage of existing facilities would not be practical since a new independent 345-kV source and pathway in the area is needed, and all existing facilities in the area are either constructed and operated at 138-kV or being upgraded for the capability. The 138-kV facilities in the area currently serve customers directly, so upgrading voltage on those lines would require all customers and existing stations to be rebuilt in order to be served from 345-kV.

Increasing the capacity of the radial 345-kV facilities already certificated and under construction by Oncor or bundling of conductors on existing 138-kV facilities would not address the reliability and operational issues under the contingency of concern because bundling conductors does not provide bi-directional looped service capability which is needed to address the reliability issues and provide operational flexibility for existing and future customers.

These reliability and operational issues are discussed in further detail in Brent Kawakami's direct testimony.

16. Schematic or Diagram:

For a standard application, provide a schematic or diagram of the applicant's transmission system in the proximate area of the project. Show the location and voltage of existing transmission lines and substations, and the location of the construction. Locate any taps, ties, meter points, or other facilities involving other utilities on the system schematic.

Figure 1 below reflects a geographical representation of the new and existing area transmission system. Figure 2 below is an electrical schematic illustrating the Project.

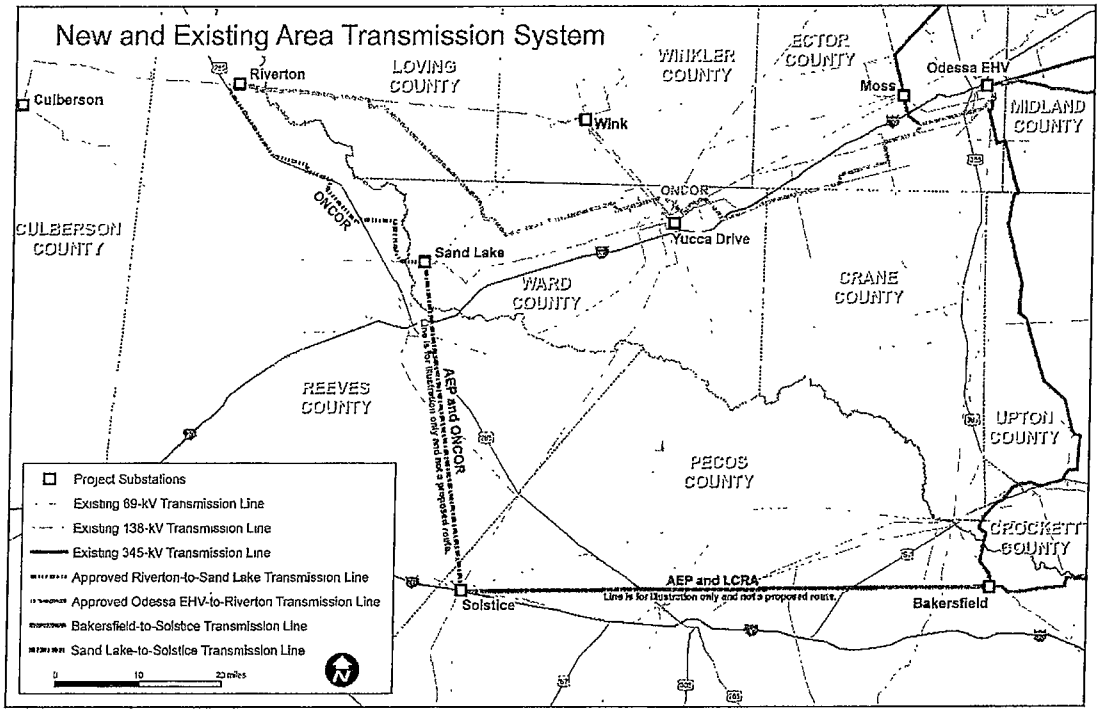

Figure 1
New and Existing Area Transmission System

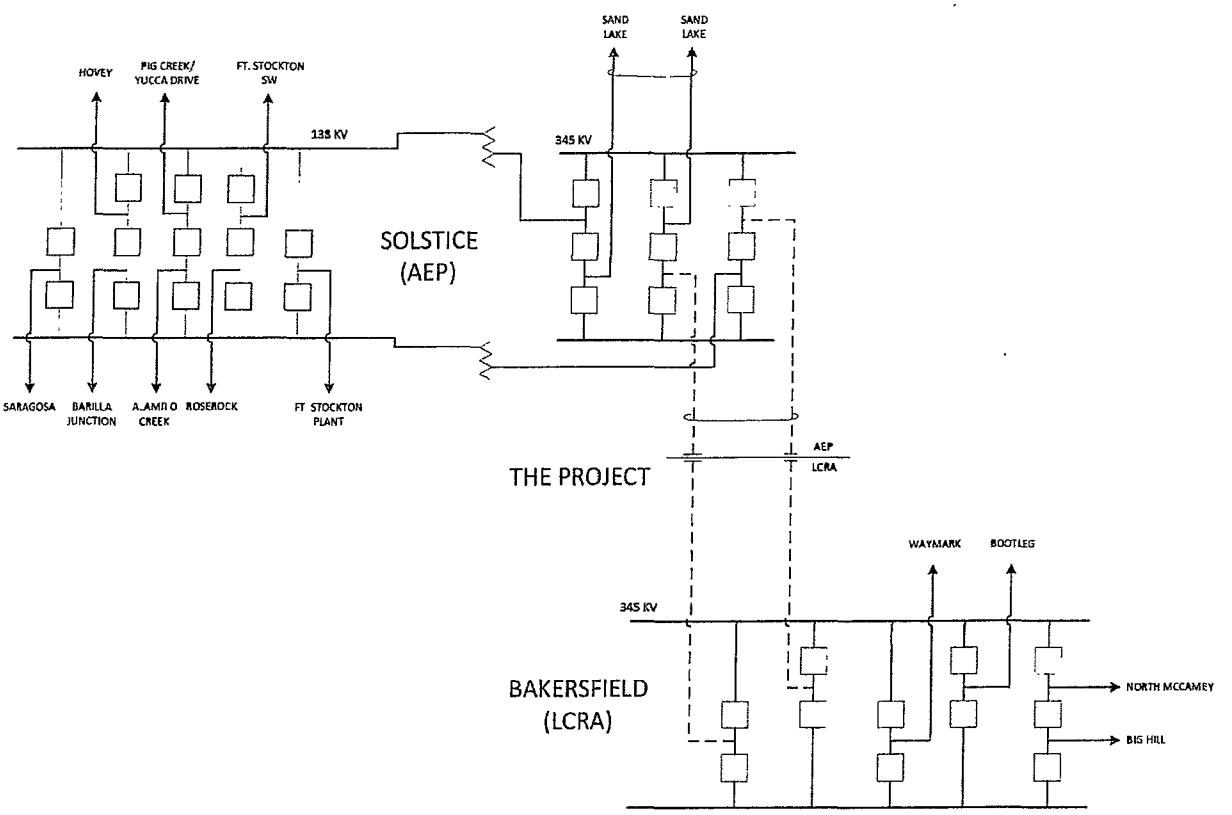

Figure 2
Schematic View of the The Project

17. **Routing Study:**

Provide a brief summary of the routing study that includes a description of the process of selecting the study area, identifying routing constraints, selecting potential line segments, and the selection of the routes. Provide a copy of the complete routing study conducted by the utility or consultant. State which route the applicant believes best addresses the requirements of PURA and P.U.C. Substantive Rules.

LCRA TSC and AEP Texas retained POWER Engineers (POWER) to prepare the EA, included as Attachment 1 to the Application. The objective of the EA was to provide information in support of this Application and to identify and evaluate a number of geographically diverse routes that are in accordance with the requirements of PURA § 37.056 (c)(4)(A)-(D), the Commission's Certificate of Convenience and Necessity (CCN) Application form, Commission Substantive Rule 25.101, and the preliminary order requirements commonly issued by the Commission for CCN projects. The EA presents the analysis that was conducted by POWER, including land use and environmental data and the effects that could result from the construction, operation, and maintenance of the

Project. The EA may also be used in support for any local, state, or federal permitting activities that may be required for the Project.

To assist POWER in its evaluation, LCRA TSC and AEP Texas provided information regarding the Project endpoints, need for the Project, engineering and design requirements, construction practices, and ROW requirements for the Project.

Selecting the Study Area

POWER, with input from LCRA TSC and AEP Texas, delineated the study area that encompassed the Project endpoints with an area sufficient for identifying geographically diverse routes. The study area was defined by the existing Project endpoints, existing ROW (roadways, railroads, and transmission lines), and existing cultural and land use features (including the Pecos County line). The study area is approximately 65 miles long by 31 miles wide, and covers an area of approximately 1,908 square miles (1,221,120 acres). The study area is shown on Figure 2-1 of the EA.

Routing Constraints

Routing constraints were identified once the study area was defined based on the criteria established in PURA § 37.056(c)(4)(A)-(D), the Commission's CCN Application form, Commission Substantive Rule 25.101, and the preliminary order requirements commonly issued by the Commission for CCN projects. POWER gathered data related to land use, aesthetics, ecology, and cultural resources. Data was collected from a variety of resources including: input from federal, state and local agencies, available maps and recent aerial imagery, ground reconnaissance surveys and input from the public open house meeting. Following this process allowed for identification of environmental and land use features such as habitable structures, parks, agriculture activities (including pivot irrigation), oil and gas wells, wind turbines and solar farms, designated critical habitat, and known cultural resource sites within the study area.

Selection of Preliminary Alternative Route Segments

Preliminary alternative route segments were identified by evaluating the mapped routing constraints data within the study area; identifying potential routing opportunities by following existing corridors such as existing roads, transmission lines, railroads, and property lines; and coordinating with University Lands (which manages significant surface and mineral interests within the study area for the benefit of the Permanent University Fund). Field reconnaissance was conducted from public access points, roads and highways to verify the feasibility of route segments. Preliminary alternative route segments were delineated to avoid known environmental and land use constraints to the extent possible. The preliminary alternative route segments were then presented to the public at an open house meeting.

Based on feedback received during and following the open house meeting, further review and input from LCRA TSC and AEP Texas, POWER modified and added additional

alternative route segments. Ultimately, 25 primary alternative routes were identified for evaluation. Evaluation of each of the primary alternative routes was based on 46 land use and environmental criteria.

Specific discussion regarding selection of the study area, identification of constraints, the identification of preliminary alternative route segments, and the evaluation of primary alternative routes is set forth in Sections 2.0, 3.0 and 4.0 of the EA.

Selection of the alternative route the applicant believes best addresses the requirements of PURA and P.U.C. Substantive Rules

Upon evaluation of the primary alternative routes, LCRA TSC and AEP Texas selected Route 24 as the primary alternative route that the joint applicants believe best addresses the requirements of PURA and the Commission's Substantive Rules. Route 24 was identified based, in part, on the following considerations:

- Has the highest percentage paralleling and adjacent to existing corridors (transmission lines, public roads/highways and apparent property boundaries) for approximately 86 percent of its total estimated length (61.5 miles of 71.1 miles);
- Has a significant portion of length parallel and adjacent to an existing transmission line currently being rebuilt from 69-kV to 138-kV which will decrease the amount of new disturbance;
- Has the 4th shortest length (along with Route 4) of the 25 primary alternative routes included in the Application (approximately 71.1 miles) and is only 3.3 miles longer than the shortest route;
- Relatively low cost, as the 4th lowest cost of the 25 primary alternative routes included in the Application (approximately $155,960,000);
- Has a relatively lower habitable structure count of 5 (habitable structures range from 0 to 14);
- Relatively low overall aesthetic impact;
- Crosses two recorded cultural resources sites and has two additional recorded resources sites located within 1,000 feet of the centerline;
- Has only 34 pipeline crossings (pipeline crossings range from 20 to 46).

In addition, the study area has significant continuing oil and gas facility growth, including pipeline construction. To the extent engineering obstacles are encountered after Commission approval that result from this continued growth, the route may need to be modified to the minimum extent necessary to avoid encountered obstacles. The Applicants will request that the Commission's Final Order provide the ability to address such facility growth consistent with good utility practice.

18. **Public Meeting or Public Open House:**
Provide the date and location for each public meeting or public open house that was held in accordance with P.U.C. PROC. R. 22.52. Provide a summary of each public meeting or public open house including the approximate number of attendants, and a copy of any survey provided to attendants and a summary of the responses received. For each public meeting or public open house provide a description of the method of notice, a copy of any notices, and the number of notices that were mailed and/or published.

LCRA TSC and AEP Texas hosted a public open house meeting for the Project on July 12, 2018, in Fort Stockton, Texas. The open house was held from 5:30 p.m. to 8:00 p.m. at the Pecos County Civic Center. Approximately 1,440 notices were mailed to owners of land within 500 feet of the centerline for each preliminary alternative route segment. Notices were also mailed to local officials, other interested parties, and the U.S. Department of Defense Siting Clearinghouse. This notice included a map of the study area depicting the preliminary alternative route segments and a frequently asked questions document. An example of the notice mailed to landowners and a copy of the attachments are located in Appendix B of the EA.

Public notice for the open house meeting was also published in *The Fort Stockton Pioneer*, a newspaper of general circulation within Pecos County, on July 5 and July 12, 2018, and announced the location, time and purpose of the meeting. An example of the published public notice is located in Appendix B of the EA.

The purpose of the meeting was to solicit comments and input from landowners, public officials, and other interested parties in regard to the purpose, need, and potential impacts and benefits of the Project and to gather a better understanding of community values and concerns. It also provided the opportunity to inform the public of the Commission certification process, routing procedures, schedule, and route approval process.

The meeting was organized as an informal come and go format with information stations that were occupied with representatives from LCRA TSC, AEP Texas, or POWER. The stations consisted of: text displays explaining various topics, topography, segment and notification maps, aerial photography, and a GIS computer station. Upon arrival, attendees were offered a preliminary alternative route segments map, questionnaire, and a frequently asked questions document. This meeting format is typically better for attendees as it allows them the opportunity to gather particular information that is most important to them and focus on topics they are most interested in. This format also allows for more individualized discussions from attendees who otherwise might be hesitant to participate in a formal presentation setting.

A total of 49 individuals attended the public open house meeting, with 16 questionnaires submitted at the meeting. An additional seven questionnaires were received after the open house for a total of 23 questionnaires submitted for the Project.

Additional information concerning the public involvement process and summarized questionnaire results is located in Section 3 of the EA. A representative copy of the questionnaire provided for the Project is included in Appendix B of the EA.

19. **Routing Maps:**

Base maps should be a full scale (one inch = not more than one mile) highway map of the county or counties involved, or other maps of comparable scale denoting sufficient cultural and natural features to permit location of all routes in the field. Provide a map (or maps) showing the study area, routing constraints, and all routes or line segments that were considered prior to the selection of the routes. Identify the routes and any existing facilities to be interconnected or coordinated with the project. Identify any taps, ties, meter points, or other facilities involving other utilities on the routing map. Show all existing transmission facilities located in the study area. Include the locations of radio transmitters and other electronic installations, airstrips, irrigated pasture or cropland, parks and recreational areas, historical and archeological sites (subject to the instructions in Question 27), and any environmentally sensitive areas (subject to the instructions in Question 29).

Provide aerial photographs of the study area displaying the date that the photographs were taken or maps that show (1) the location of each route with each route segment identified, (2) the locations of all major public roads including, as a minimum, all federal and state roadways, (3) the locations of all known habitable structures or groups of habitable structures (see Question 19 below) on properties directly affected by any route, and (4) the boundaries (approximate or estimated according to best available information if required) of all properties directly affected by any route.

For each route, cross-reference each habitable structure (or group of habitable structures) and directly affected property identified on the maps or photographs with a list of corresponding landowner names and addresses and indicate which route segment affects each structure/group or property.

<u>Base Maps</u>

Figures 3-14a, b, and c of the EA (Appendix D), titled *Primary Alternative Routes*, produced at a scale of 1 inch = 3,000 feet, are provided in map pockets in the EA. These maps were produced using a USGS topographic base. They depict the study area for the project, locations of radio transmitters and other electronic installations, airports/airstrips, parks and recreational areas, historical sites, environmentally sensitive areas and other

constraints. The maps also contain the alternative routes for the project. For their protection, locations of archaeological sites are not shown on the maps.

Figures 4-1a, b, and c of the EA (Appendix E), titled *Habitable Structures and Other Land Use Features in the Vicinity of the Alternative Routes*, which consists of aerial photography produced at a scale of 1 inch = 3,000 feet, are provided in a map pocket in the EA. The aerial photo-based maps include parcel boundaries identified from a review of the tax appraisal district records and combined, as appropriate, to reflect instances where multiple parcels are owned by a single individual or group in the study area. The locations of all known habitable structures located within 500 feet of the centerline of primary alternative routes on properties directly affected by the project are also identified on Figures 4-1a, b, and c. The habitable structures and other land use features map (Figures 4-1a, b, and c) was produced using aerial imagery flown in February 2018.

Base maps include sufficient cultural and natural features to permit location of the alternative routes in the field, and they depict existing electric transmission lines and substations (based on information available to POWER), and major public roads located within the study area, as applicable.

A map showing the study area and all preliminary route segments in a format similar to EA Figures 3-14a, b, c and 4-1a, b, c was presented at the public open house meeting. Figure 3-1 depicts the preliminary route segments presented at the open house.

Directly Affected Property Maps

Attachment 4 to this application includes 10 maps (utilizing aerial photography) titled *Location of Directly Affected Parcels and Habitable Structures,* that identify directly affected properties, tract IDs, and the location of habitable structures (including labels) within approximately 500 feet of the centerline of the transmission line alternatives and approximate parcel boundary lines (based on tax appraisal district records). These maps show the location of each proposed alternative route with each route segment identified, and the locations of all major public roads including all federal and state roadways.

Attachment 6 to this Application is a list that cross-references each habitable structure, or group of habitable structures, and directly affected properties identified on the maps provided in Attachment 4 with a list of tract IDs and corresponding landowner names and addresses. Landowner names and addresses were obtained by review of information obtained from the Pecos County Appraisal District.

20. **Permits:**

List any and all permits and/or approvals required by other governmental agencies for the construction of the proposed project. Indicate whether each permit has been obtained.

Upon approval of the Application by the PUC, the following permits/approvals would be required and obtained prior to the commencement of construction:

- Where the proposed transmission line crosses a state-maintained road or highway, LCRA TSC and AEP Texas will obtain a permit from Texas Department of Transportation (TxDOT). If any portion of the transmission line will be accessed from a state-maintained road or highway, LCRA TSC and AEP Texas will obtain a permit from TxDOT.
- Where the transmission line crosses a state-owned riverbed or navigable stream, LCRA TSC and AEP Texas will obtain a Miscellaneous Easement (ME) from the General Land Office (GLO).
- Since more than one acre will be disturbed during construction of the project, a Storm Water Pollution Prevention Plan (SWPPP) will be necessary. Further, because more than five acres will be disturbed, a Notice of Intent (NOI) will be prepared by LCRA TSC and AEP Texas for the Texas Commission on Environmental Quality (TCEQ). The controls specified in the SWPPP will be monitored in the field.
- Upon approval of the Application and prior to construction, a detailed Natural Resources Assessment (NRA) and Cultural Resources Assessment (CRA) will be performed on the approved route. Depending upon the results of these assessments, permits or regulatory approvals may be required from the U.S. Army Corps of Engineers (USACE), USFWS, TCEQ, THC/SHPO or Pecos County. Such permits or regulatory approvals will be obtained by LCRA TSC and AEP Texas prior to construction.
- After alignments and structure locations/heights are designed and engineered, LCRA TSC and AEP Texas will make a final determination of the need for Federal Aviation Administration (FAA) notification, based on structure locations and designs. In some areas, if necessary, LCRA TSC and AEP Texas could use lower-than-typical structure heights and could add marking and/or lighting to certain structures to avoid or accommodate FAA requirements.
- LCRA TSC and AEP Texas will report the status of the Proposed Project to the PUC on LCRA TSC and AEP Texas' Monthly Construction Progress Report, beginning with the first report following the filing of a CCN application, and in each subsequent monthly progress report until construction is completed and actual project costs have been reported. As required by the PUC, LCRA TSC and AEP Texas will submit locational and attribute data for the approved route after it is constructed.

21. **Habitable structures:**

For each route list all single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline if the proposed project will be constructed for operation at 230kV or less, or within 500 feet of the centerline if the proposed project will be constructed for operation at greater than 230kV. Provide a general description of each habitable structure and its distance from the centerline of the route. In cities, towns or rural subdivisions, houses can be identified in groups. Provide the number of habitable structures in each group and list the distance from the centerline of the route to the closest and the farthest habitable structure in the group. Locate all listed habitable structures or groups of structures on the routing map.

The locations of habitable structures within 500 feet of the centerline of each route segment are listed and described with approximate distance from the route segment centerline in Appendix C, Tables 4-3 through 4-27 of the EA and are shown on Figures 4-1a, b, and c in Appendix E of the EA. The total numbers of habitable structures for the 25 primary alternative routes are provided in the table below.

Primary Alternative Route	Total Number of Habitable Structures within 500 feet of the ROW Centerline
1	5
2	5
3	11
4	2
5	8
6	11
7	10
8	5
9	5
10	0
11	5
12	0
13	0
14	2

Primary Alternative Route	Total Number of Habitable Structures within 500 feet of the ROW Centerline
15	2
16	2
17	8
18	0
19	0
20	0
21	0
22	0
23	14
24	5
25	2

22. Electronic Installations:

For each route, list all commercial AM radio transmitters located within 10,000 feet of the center line of the route, and all FM radio transmitters, microwave relay stations, or other similar electronic installations located within 2,000 of the center line of the route. Provide a general description of each installation and its distance from the center line of the route. Locate all listed installations on a routing map.

There are no known commercial AM radio transmitters located within 10,000 feet of any of the primary alternative routes. There are seven known communication towers (FM radio transmitters, microwave towers, or other similar electronic installations) that are located within 2,000 feet of any of the primary alternative routes.

A listing, description, and approximate distance from the centerline of each of the primary alternative routes are presented in Table 4-29 and Appendix C, Tables 4-3 through 4-27 of the EA, and the locations of these electronic installations are shown on Figures 3-14a, b, c and 4-1a, b, c, in Appendix D and E of the EA.

For additional information on electronic installations see Section 2.4.6 and Section 4.2.4 of the EA. None of the routes filed in this Application are anticipated to have any impact on the existing communication towers.

23. **Airstrips:**

For each route, list all known private airstrips within 10,000 feet of the center line of the project. List all airports registered with the Federal Aviation Administration (FAA) with at least one runway more than 3,200 feet in length that are located within 20,000 feet of the center line of any route. For each such airport, indicate whether any transmission structures will exceed a 100:1 horizontal slope (one foot in height for each 100 feet in distance) from the closest point of the closest runway. List all listed airports registered with the FAA having no runway more than 3,200 feet in length that are located within 10,000 feet of the center line of any route. For each such airport, indicate whether any transmission structures will exceed a 50:1 horizontal slope from the closest point of the closest runway. List all heliports located within 5,000 feet of the center line of any route. For each such heliport, indicate whether any transmission structures will exceed a 25:1 horizontal slope from the closest point of the closest landing and takeoff area of the heliport. Provide a general description of each listed private airstrip, registered airport, and heliport; and state the distance of each from the center line of each route. Locate and identify all listed airstrips, airports, and heliports on a routing map.

POWER's review of federal and state aviation/airport maps and directories, aerial photo interpretation and reconnaissance surveys, identified one (1) FAA-registered airport, and no public-use heliports located within 5,000 feet of the centerline of any alternate route since there are no heliports located within or near the study area. According to initial analysis (the final heights of specific structures have not yet been determined), transmission structures may penetrate a 100:1 slope around the Fort Stockton-Pecos County Airport (runway length: 4,400 feet). Three private airstrips were identified within 10,000 feet of the centerline of one or more primary alternative routes.

Each airport/airstrip is listed and described with the approximate distance from the centerline of each of the primary alternative routes in Table 4-28 and Appendix C, Tables 4-3 through 4-27 of the EA. These facilities are shown on Figures 3-14a, b, c and 4-1a, b, c in Appendix D and E of the EA.

For additional information on airports/airstrips see Section 2.4.6 and Section 4.2.4 of the EA. No significant impacts to these airports/airstrips are anticipated from construction of the Proposed Project. Following approval of a route by the PUC, LCRA TSC and AEP Texas will make a final determination of the need for FAA notification, based on specific route location and structure design. The result of this notification, and any subsequent coordination with FAA, could include changes in the line design and/or potential requirements to mark and/or light the structures.

24. Irrigation Systems:

For each route identify any pasture or cropland irrigated by traveling irrigation systems (rolling or pivot type) that will be traversed by the route. Provide a description of the irrigated land and state how it will be affected by each route (number and type of structures etc.). Locate any such irrigated pasture or cropland on a routing map.

Based on POWER's review of aerial photography and field reconnaissance, no primary alternative route of the Proposed Project crosses any known cropland or pastureland irrigated by traveling irrigation systems, either rolling or pivot type.

25. Notice:

Notice is to be provided in accordance with 16 TAC § 22.52.

A. Provide a copy of the written direct notice to owners of directly affected land. Attach a list of the names and addresses of the owners of directly affected land receiving notice.

A copy of the written notice, with enclosures, that is being mailed to owners of directly affected land is included as Attachment 5 to the Application. A list of the names and addresses of those owners of directly affected land to whom notice was mailed by first-class mail is included as Attachment 6 to the Application. LCRA TSC and AEP Texas determined the names of the landowners of record and their mailing addresses based on information obtained from the Pecos County Appraisal District.

B. Provide a copy of the written notice to utilities that are located within five miles of the routes.

A copy of the written notice, with enclosures, sent to utilities that are located within five miles of the Project is provided in Attachment 7 to the Application. Additionally, LCRA TSC and AEP Texas sent notice of the Application to owners/operators of steel hydrocarbon pipelines and railroads parallel and adjacent to a primary alternative route included in the Application. A list of the names and addresses of utilities, pipeline owners/operators, and railroads to whom written notice was sent are included in Attachment 8 to the Application.

C. Provide a copy of the written notice to county and municipal authorities.

A copy of the written notice, with enclosures, sent to county and municipal authorities is provided as Attachment 7 to this Application. LCRA TSC and AEP Texas additionally sent notice of the Application to the Texas Office of Public Utility Counsel, independent school district officials, the Department of Defense

Siting Clearinghouse, and state and federal elected officials (identified in Attachment 8).

D. **Provide a copy of the notice that is to be published in newspapers of general circulation in the counties in which the facilities are to be constructed. Attach a list of the newspapers that will publish the notice for this application. After the notice is published, provide the publisher's affidavits and tear sheets.**

A copy of the public notice that will be published in *The Fort Stockton Pioneer* (a newspaper of general circulation in Pecos County where the transmission facilities are to be constructed) once for one week after the Application is filed with the Commission is included as Attachment 9 to the Application. Publisher's affidavits will be filed with the Commission showing proof of notice as soon as available after filing of the Application.

For a CREZ application, in addition to the requirements of P.U.C. PROC. R. 22.52 the applicant shall, not less than twenty-one (21) days before the filing of the application, submit to the Commission staff a "generic" copy of each type of alternative published and written notice for review. Staff's comments, if any, regarding the alternative notices will be provided to the applicant not later than seven days after receipt by Staff of the alternative notices, Applicant may take into consideration any comments made by Commission staff before the notices are published or sent by mail.

Not applicable.

26. **Parks and Recreation Areas:**
For each route, list all parks and recreational areas owned by a governmental body or an organized group, club, or church and located within 1,000 feet of the center line of the route. Provide a general description of each area and its distance from the center line. Identify the owner of the park or recreational area (public agency, church, club, etc.). List the sources used to identify the parks and recreational areas. Locate the listed sites on a routing map.

POWER reviewed U.S. Geological Survey topographic maps, TxDOT county highway maps, recent aerial photography, and conducted field reconnaissance to identify parks and recreation areas within the study area. Based on this review, POWER identified five parks or recreational areas located within 1,000 feet of the centerline of one or more of the primary alternative routes.

A listing, description, and approximate distance from the centerline for each of the primary alternative routes are presented in Table 4-30 and Appendix C, Tables 4-3

through 4-27 of the EA and the locations of these parks and recreation areas are shown on Figures 3-14a, b, c and 4-1a, b, c, in Appendix D and E of the EA.

For more information on parks and recreational areas see Section 2.4.7 and Section 4.2.5 of the EA. No significant impacts to the use or enjoyment of the parks and recreation facilities located within the study area are anticipated from any of the primary alternative routes.

27. **Historical and Archeological Sites:**
For each route, list all historical and archeological sites known to be within 1,000 feet of the center line of the route. Include a description of each site and its distance from the center line. List the sources (national, state or local commission or societies) used to identify the sites. Locate all historical sites on a routing map. For the protection of the sites, archeological sites need not be shown on maps.

POWER conducted a literature review and records search at the Texas Historical Commission and The Texas Archeological Research Laboratory at the University of Texas at Austin to identify known historical and archeological sites located within 1,000 feet of the centerline of each of the primary alternate routes. For more information regarding site descriptions and the evaluation of the historical and archeological sites located within the study area, see Section 2.7 and Section 4.3 of the EA.

Based on POWER's review, 37 recorded archeological sites are located within 1,000 feet of the centerline of one or more of the primary alternative routes. Ten of the identified sites are crossed by the primary alternative route ROWs. Thirty-two of the sites are recorded as prehistoric sites, three are recorded as historic sites, and two of the sites have both prehistoric and historic components. These sites are listed and described with the approximate distance from the centerline for each of the primary alternative routes in Table 4-31 and Appendix C, Tables 4-3 through 4-27 of the EA. For the protection of these sites, they are not shown on the routing maps.

28. **Coastal Management Program:**
For each route, indicate whether the route is located, either in whole or in part, within the coastal management program boundary as defined in 31 T.A.C. §503.1. If any route is, either in whole or in part, within the coastal management program boundary, indicate whether any part of the route is seaward of the Coastal Facilities Designation Line as defined in 31 T.A.C. §19.2(a)(21). Using the designations in 31 T.A.C. §501.3(b), identify the type(s) of Coastal Natural Resource Area(s) impacted by any part of the route and/or facilities.

No part of any primary alternative route is located within the Coastal Management Program boundary, as defined in 31 TAC § 503.1.

29. Environmental Impact:

Provide copies of any and all environmental impact studies and/or assessments of the project. If no formal study was conducted for this project, explain how the routing and construction of this project will impact the environment. List the sources used to identify the existence or absence of sensitive environmental areas. Locate any environmentally sensitive areas on a routing map. In some instances, the location of the environmentally sensitive areas or the location of protected or endangered species should not be included on maps to ensure preservation of the areas or species. Within seven days after filing the application for the project, provide a copy of each environmental impact study and/or assessment to the Texas Parks and Wildlife Department (TPWD) for its review at the address below. Include with this application a copy of the letter of transmittal with which the studies/assessments were or will be sent to the TPWD.

Wildlife Habitat Assessment Program
Wildlife Division
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

The applicant shall file an affidavit confirming that the letter of transmittal and studies/assessments were sent to TPWD.

The EA describes the natural resources, cultural resources, land uses, and other sensitive areas that may occur within the study area. The EA also describes how the Project may impact such resources. Specifically, the EA includes data obtained from TPWD, including the Texas Natural Diversity Database (TXNDD) and a list of Ecologically Significant Stream Segments (ESSS) in the study area.

LCRA TSC and AEP Texas will provide a copy of the EA to TPWD within seven days after the Application is filed. A copy of the letter of transmittal of the EA to TPWD is provided as Attachment 10 to this Application. An affidavit confirming that the letter of transmittal and a copy of the EA were sent to TPWD will be filed with the Commission.

30. Affidavit

Attach a sworn affidavit from a qualified individual authorized by the applicant to verify and affirm that, to the best of their knowledge, all information provided, statements made, and matters set forth in this application and attachments are true and correct.

A sworn affidavit is attached below.

AFFIDAVIT OF SONYA STRAMBLER

STATE OF TEXAS §
§
§

Before me, the undersigned authority, Sonya Strambler, being first duly sworn, deposes and states:

"My name is Sonya Strambler. I am a Regulatory Case Manager for the Lower Colorado River Authority. I am over the age of twenty-one, and am competent to make the following affidavit:

> On behalf of LCRA Transmission Services Corporation (LCRA TSC) and in my capacity as Regulatory Case Manager on the Bakersfield to Solstice 345-kV Transmission Line Project, I am authorized to file and verify the CCN Application for LCRA TSC. I am personally familiar with the documents filed with this application, and I have complied with all the requirements contained in the application; furthermore, all such statements made and matters set forth herein with respect to LCRA TSC are true and correct."

Sonya Strambler
Affiant

SUBSCRIBED AND SWORN TO BEFORE ME, a Notary Public in and for the State of Texas, this 1st day of November, 2018.

LEAGINA EDDY
Notary Public, State of Texas
Comm. Expires 05-05-2020
Notary ID 2408781

Notary Public

AFFIDAVIT OF BRENT W HARRIS

STATE OF OKLAHOMA §
§
COUNTY OF TULSA §

Before me, the undersigned authority, Brent W. Harris, being first duly sworn, deposes and states:

"My name is Brent W. Harris. I am a Project Manager Principle (Project Manager) employed by American Electric Power Company (AEPSC) in the Transmission Services Department for ERCOT, which provides engineering, construction, and project management services to AEP Texas Inc. (AEP Texas). I am over the age of twenty-one, and am competent to make the following affidavit. On behalf of AEP Texas and in my capacity as the AEPSC Project Manager representing AEP Texas on the Bakersfield to Solstice 345-kV Transmission Line Project, I am qualified and authorized to file and verify such application on behalf of AEP Texas, am personally familiar with the maps and exhibits filed with this application, and have complied with all the requirements contained in the application; and, that all statements made and matters set forth therein and all exhibits attached thereto by AEP Texas are true and correct. I further state that the application is made in good faith, that notice of its filing is being provided in accordance with 16 TAC §25.174, and that this application does not duplicate any filing presently before the Commission."

Brent W. Harris
Project Manager Principle
AEPSC

SUBSCRIBED AND SWORN TO BEFORE ME, a Notary Public in and for the State of Oklahoma, this 1st day of Nov, 2018.

ANITA C. WALKER NOTARY PUBLIC No. 14002234 EXP. 3/06/2022 IN AND FOR STATE OF OKLAHOMA

Anita C. Walker
Notary Public State of Oklahoma

My Commission Expires: March 6, 2022

November 2018

AEP TEXAS, INC.

LCRA TRANSMISSION SERVICES CORPORATION

Bakersfield to Solstice 345-kV Transmission Line Project
Environmental Assessment and Alternative Route Analysis

Pecos County, Texas

PROJECT NUMBER:
149604

PROJECT CONTACT:
Lisa Barko Meaux
EMAIL:
lisa barko@powereng com
PHONE:
281-765-5507

POWER ENGINEERS

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Bakersfield to Solstice 345-kV Transmission Line Project

PREPARED FOR: *AEP TEXAS, INC AND LCRA TRANSMISSION SERVICES CORPORATION*

PREPARED BY: *POWER ENGINEERS, INC (HOUSTON, TEXAS)*

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ACRONYMS AND ABBREVIATIONS

AEP Texas	American Electric Power Texas, Inc.
AM radio	Amplitude modulation radio
ACSS	aluminum conductor, steel-supported
amsl	above mean sea level
B.P.	Before Present
BEG	Bureau of Economic Geology
BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices
CCN	Certificate of Convenience and Necessity
CCVT	Capacitance Coupled Voltage Transformer
CFR	Code of Federal Regulations
CLF	civilian labor force
CMP	Coastal Management Program
CR	County Road
CWA	Clean Water Act
DoD	Department of Defense Siting Clearinghouse
EA	Environmental Assessment
EMST	Ecological Mapping Systems of Texas
ERCOT	Electric Reliability Council of Texas
ESA	Endangered Species Act
ESSS	Ecologically Significant Stream Segment
FAA	Federal Aviation Administration
FCC	Federal Communication Commission
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FM	Farm-to-Market Road
FM radio	Frequency modulation radio
FPPA	Farmland Protection Policy Act
GIS	Geographic Information System
GLO	Texas General Land Office
HPA	high probability areas
HTC	Historic Texas Cemeteries
IH	Interstate Highway
IPaC	USFWS Information for Planning and Conservation
ISD	Independent School District
kcmil	thousand circular mils
kV	kilovolt
LCRA TSC	LCRA Transmission Services Corporation
MBTA	Migratory Bird Treaty Act
ME	Miscellaneous Easement
MVA	Megavolt-amperes
MW	megawatt

NCED	National Conservation Easement Database
NEPA	National Environmental Protection Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHD	National Hydrology Dataset
NOI	Notice of Intent
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NWP	Nationwide Permit
NWSRS	National Wild and Scenic Rivers System
OPGW	fiber optic ground wire
OTHM	Official Texas Historical Marker
PEM	palustrine emergent
POWER	POWER Engineers, Inc.
PSS	shrub
PUC	Public Utility Commission of Texas
PURA	Public Utility Regulation Act
RIP	Record-Investigate-Protect
ROW	right-of-way
RRC	Railroad Commission of Texas
RTHL	Recorded Texas Historical Landmarks
SAL	State Antiquities Landmarks
SCS	Soil Conservation Service
SH	State Highway
SHPO	State Historic Preservation Office(r)
SWPPP	Storm Water Pollution Prevention Plan
TAC	Texas Administrative Code
TARL	Texas Archeological Research Laboratory
TASA	Texas Archeological Site Atlas
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
THSA	Texas Historical Sites Atlas
TLC	Texas Land Conservancy
TNC	Texas Nature Conservancy
TNRIS	Texas Natural Resource Information System
TPWD	Texas Parks and Wildlife Department
TSS	Texas Speleological Society
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
TxSDC	Texas State Data Center
UHF	Ultra-High Frequency

US	United States
US Hwy	United States Highway
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VHF	Very High Frequency
VORTAC	VHF Omnidirectional Range/Tactical Aid to Navigation

1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 SCOPE OF THE PROJECT

LCRA Transmission Services Corporation (LCRA TSC) and American Electric Power, Texas Inc. (AEP Texas) propose to build a new double-circuit 345-kilovolt (kV) transmission line in Pecos County (the Proposed Project). LCRA TSC will construct, own, operate, and maintain the eastern half of the transmission line connecting to LCRA TSC's Bakersfield Station and AEP Texas will construct, own, operate, and maintain the western half of the transmission line connecting to AEP Texas' Solstice Switch Station. The new transmission line will range from approximately 67.8 to 91.7 miles long, depending on the route ultimately selected by the Public Utility Commission of Texas (PUC or Commission). The Proposed Project also involves construction of interconnection facilities at the existing Bakersfield Station and constructing a 345-kV expansion station adjacent to the existing 138-kV Solstice Switch Station. Figure 1-1 shows the location and extent of the Proposed Project.

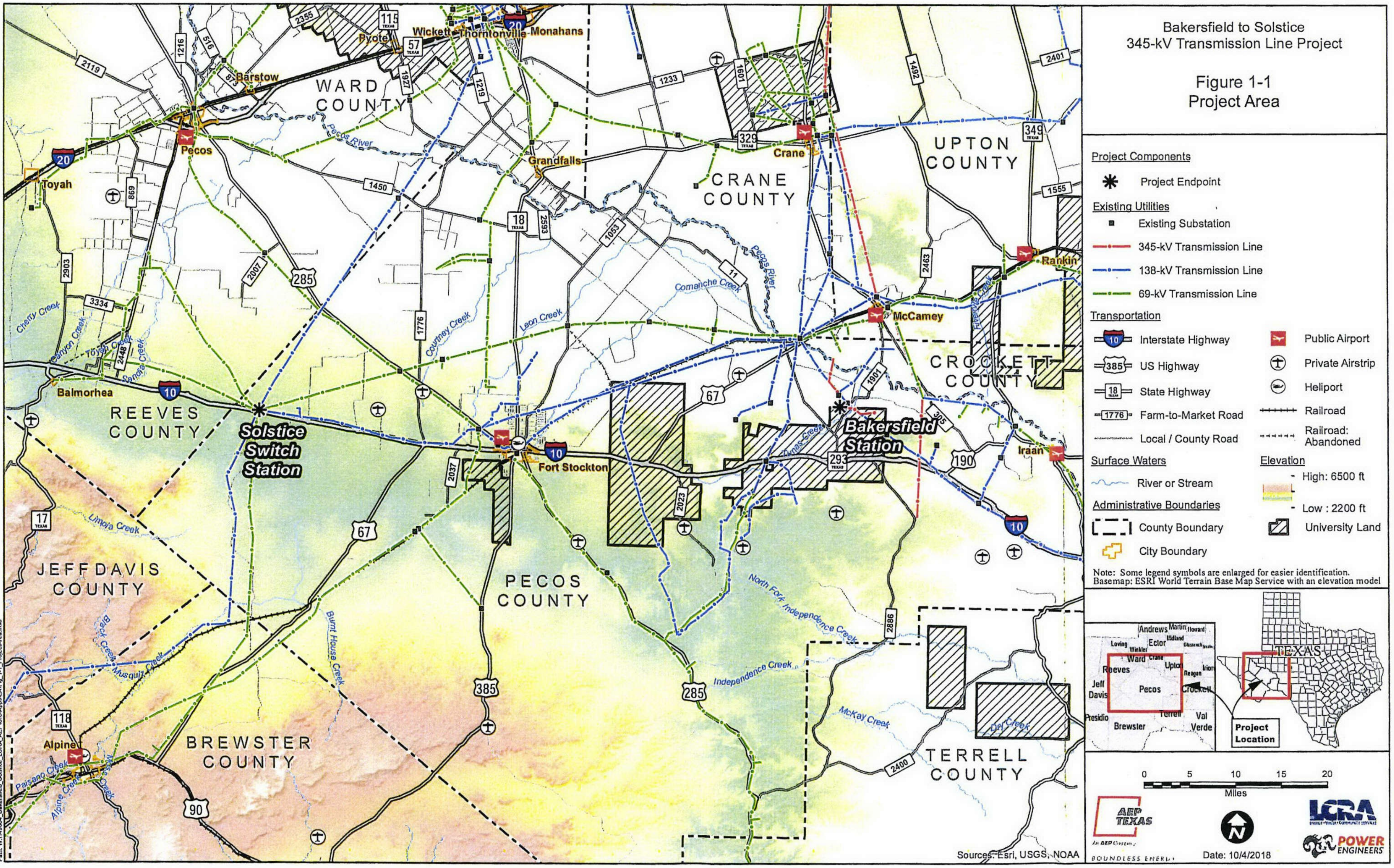
The Proposed Project will support the increasing electricity demand in the area of Texas that is generally west of McCamey and Odessa, referred to here as the Far West Texas region. The Electric Reliability Council of Texas (ERCOT), with the involvement of the transmission utilities in the Far West Texas region, conducted studies regarding the electric transmission infrastructure in the region. On June 21, 2017, the ERCOT Board of Directors determined that the Proposed Project was necessary to meet North American Electric Reliability Corporation (NERC) and ERCOT reliability performance standards. On June 12, 2018, the ERCOT Board of Directors endorsed the Proposed Project as critical to the reliability of the ERCOT System pursuant to 16 Texas Administrative Code (TAC) § 25.101(b)(3)(D) and approved ERCOT staff's recommendation to construct the transmission line with two circuits.

LCRA TSC and AEP Texas require PUC approval to amend their respective Certificate of Convenience and Necessity (CCN) to construct, own, operate, and maintain their 50 percent portion of the Proposed Project. The dividing point will be determined following the PUC's approval of the final transmission line route. LCRA TSC will own, operate, and maintain all transmission line facilities, including conductors, wires, structures, hardware, and easements of the eastern half of the transmission line connecting to the Bakersfield Station and AEP Texas will own, operate, and maintain all transmission line facilities, including conductors, wires, structures, hardware, and easements of the western half of the transmission line connecting to the Solstice Switch Station.

1.2 PURPOSE AND NEED

The Proposed Project is necessary to support the increasing electricity demand in the Far West Texas region. The increasing demand is directly related to a significant present and forecasted increase in oil and gas production and processing in the Far West Texas region. The electrical load demand in Far West Texas is expected to grow in excess of 1,000 megawatts (MW) along a portion of the electric system referred to as the Culberson Loop, which spreads into five different counties generally west of Monahans, Texas for approximately 85 miles.

In June 2017, the ERCOT Board of Directors endorsed construction of the Proposed Project as a double-circuit capable 345-kV transmission line with an initial single circuit installed from Bakersfield to Solstice. In June 2018, in response to accelerating and increasing demand growth in the region, the ERCOT Board of Directors endorsed expanding the Proposed Project to include installation of the second circuit at the time of initial construction and determined that the Proposed Project is critical to the reliability of the ERCOT System. The ERCOT Board of Directors' endorsement and critical designation also included construction of an additional double-circuit 345-kV transmission line from Solstice to Sand Lake and the addition of a second 345-kV circuit on existing structures from Odessa to Riverton and Riverton to Sand Lake. A graphic diagram showing the combined projects to meet the need of the load growth in this area endorsed by the ERCOT Board of Directors is provided as Figure 1-2.


Bakersfield to Solstice
345-kV Transmission Line Project
Figure 1-1
Project Area
Project Components
Project Endpoint
Existing Utilities
Existing Substation
345-kV Transmission Line
138-kV Transmission Line
69-kV Transmission Line
Transportation
Interstate Highway
US Highway
State Highway
Farm-to-Market Road
Local / County Road
Public Airport
Private Airstrip
Heliport
Railroad
Railroad: Abandoned
Surface Waters
River or Stream
Elevation
High: 6500 ft
Low : 2200 ft
Administrative Boundaries
County Boundary
City Boundary
University Land
Note: Some legend symbols are enlarged for easier identification.
Basemap: ESRI World Terrain Base Map Service with an elevation model
Project Location
TEXAS
0 5 10 15 20
Miles
Date: 10/4/2018
Sources: Esri, USGS, NOAA
WARD COUNTY
CRANE COUNTY
UPTON COUNTY
CROCKETT COUNTY
REEVES COUNTY
PECOS COUNTY
JEFF DAVIS COUNTY
BREWSTER COUNTY
TERRELL COUNTY
Solstice Switch Station
Bakersfield Station
Pecos
Toyah
Barstow
Pyote
Wickett
Thorntonville
Monahans
Grandfalls
Crane
Rankin
McCamey
Iraan
Fort Stockton
Balmorhea
Alpine
Pecos River
Comanche Creek
Leon Creek
Courtney Creek
Toyah Creek
Sandia Creek
Cherry Creek
Limpia Creek
Musquiz Creek
Burnt House Creek
North Fork Independence Creek
Independence Creek
McKay Creek
Paisano Creek
Alpine Creek

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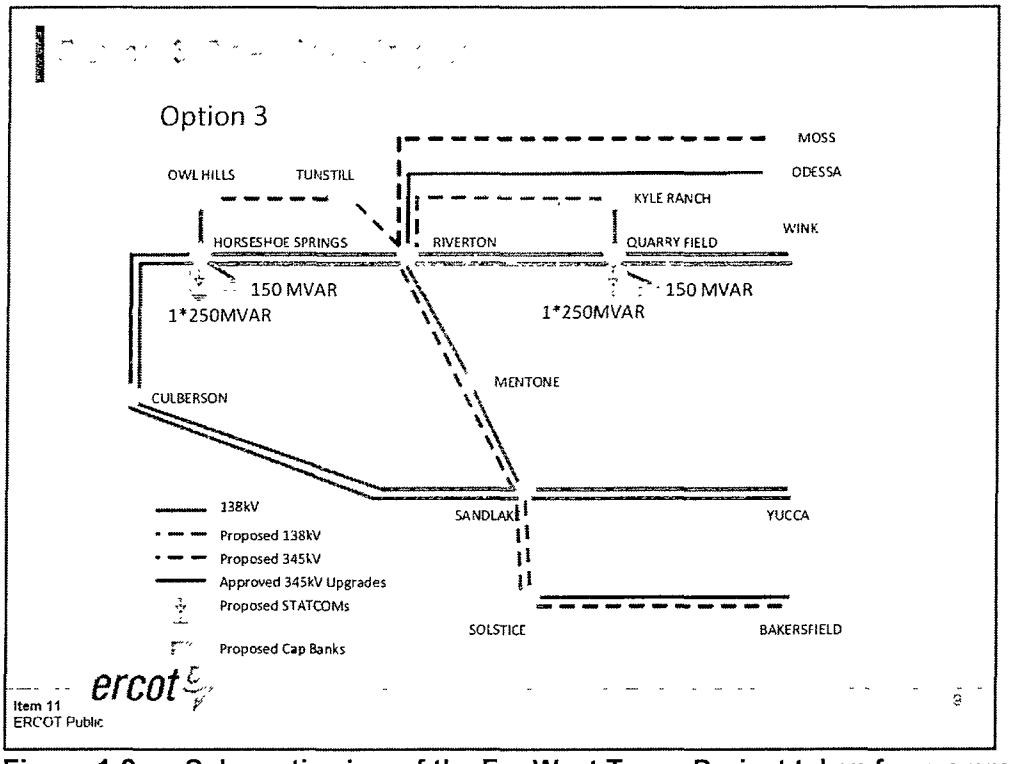


Figure 1-2 Schematic view of the Far West Texas Project taken from a presentation to the ERCOT Board of Directors made on June 12, 2018

1.3 AGENCY ACTIONS

Numerous federal, state, and local regulatory agencies and organizations have developed rules and regulations regarding the routing and potential impacts associated with the construction of the Proposed Project. This section describes the major regulatory agencies and additional issues that are involved in project planning and permitting of transmission lines in Texas. POWER Engineers, Inc. (POWER) solicited comments from various regulatory entities during the development of this document, and records of correspondence and additional discussions with these agencies and organizations are provided in Appendix A.

This environmental assessment (EA) in support of LCRA TSC and AEP Texas' joint application to amend their respective CCN from the PUC is intended to provide information on certain environmental and land use factors identified in § 37.056(c)(4) of the Texas Utilities Code, 16 TAC § 25.101(b)(3)(B), the PUC's CCN application form, and other requirements commonly included in the PUC's preliminary orders for transmission line CCN projects. This EA may also be used in support of any other local, state, or federal permitting requirements, if necessary.

1.3.1 Public Utility Commission of Texas

The PUC regulates the routing of transmission lines in Texas under § 37.056(c)(4)(A)-(D) of the Texas Utilities Code. The PUC regulatory requirements for routing and constructing transmission lines in Texas include:

- 16 TAC § 25.101(b)(3)(B), including the PUC's policy of prudent avoidance;
- 16 TAC § 22.52(a)(4) CCN application requirements;
- PUC preliminary orders for CCN applications; and
- PUC final order approving a project.

Appropriate measures will be taken during engineering design to ensure that any specific provisions of the PUC's final order regarding environmental and right-of-way (ROW) impacts are addressed. If necessary, these measures will be specifically addressed in construction documents, specifications, or other instructions. Following completion of the design, a preconstruction meeting will be held, which will include a review of any regulatory requirements. A physical inspection of the Proposed Project will be performed following project completion to ensure all regulatory requirements were met during construction.

Following issuance of a final order approving the Proposed Project, LCRA TSC and AEP Texas will report the status of the construction of their respective portions of the Proposed Project to the PUC through Monthly Construction Progress Reports. The first report will be filed with the PUC the first month following the approval of the CCN application, and in each subsequent monthly progress report until construction is completed and actual Proposed Project costs have been reported. As required by the PUC, LCRA TSC and AEP Texas will submit location and attribute data for the approved route after it is constructed.

Similarly, as LCRA TSC or AEP Texas identify other obstacles and engineering constraints along their portion of the approved route, they will adjust alignments, adjust structure locations/heights, and/or take other actions consistent with a final order approving the Proposed Project.

1.3.2 United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) is directed by Congress under Section 10 of the Rivers and Harbors Act of 1899 (33 United States Code [U.S.C.] § 403) and Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344) to implement these statues. Under Section 10, the USACE regulates all work or structures in or affecting the course, condition, or capacity of navigable Waters of the United States (US). The intent of this law is to protect the navigable capacity of waters important to interstate commerce. Under Section 404, the USACE regulates the discharge of dredged and fill material into all waters of the US, including associated wetlands. The intent of this law is to protect the "waters of the US" and aquatic ecosystems from the indiscriminate discharge of material capable of causing pollution and to restore and maintain their chemical, physical, and biological integrity. USACE approval is required for any route that would cross fee-owned property of the USACE. Other permits may also be required from the USACE for routes that cross waters of the US, including wetlands.

The Proposed Project is located within the jurisdiction of the USACE – Albuquerque District. Review of the National Hydrology Dataset (NHD) and National Wetland Inventory (NWI) maps indicated numerous surface waters of the US and associated areas of potential wetlands within the study area. Upon PUC approval of a route, additional coordination, jurisdictional wetland verifications, and permitting with the USACE – Albuquerque District for a Section 404 Permit might be required. Based on the Proposed Project footprint and construction techniques proposed, the construction of the Proposed Project will likely meet the criteria for the Nationwide Permit (NWP) No. 12 - Utility Line Activities, which apply to activities associated with any cable, line, or wire for the transmission of electrical energy. If the proposed impacts of the Proposed Project exceed the criteria established under General Condition 13 or other

regional conditions listed under the NWP 12, then a Regional General Permit might be required. An Individual Permit is not anticipated for this project.

1.3.3 United States Fish and Wildlife Service

The United States Fish and Wildlife Service (USFWS) is charged with the responsibility for enforcement of federal wildlife laws and providing comments on proposed construction projects with a federal nexus under the National Environmental Policy Act (NEPA) and within the framework of several federal laws including the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA). POWER requested a USFWS Information for Planning and Conservation (IPaC) review and official species list to identify potentially occurring federally protected species and designated critical habitats within the study area (Consultation Code: 02ETAR00-2017-SLI-0747). POWER also reviewed the Texas Natural Diversity Database (TXNDD) records of federal and state listed species occurrences, rare vegetation communities, and/or species of concern. POWER considered these during the route development process.

Upon PUC approval of a route and prior to construction, surveys will be completed as determined necessary to identify any potentially suitable habitat for federally listed species. If suitable habitat is identified, then informal consultation with the USFWS – Austin Ecological Services Field Office might need to occur to determine the need for any required species-specific surveys and/or permitting under Section 7 of the ESA.

1.3.4 Federal Aviation Administration

According to Federal Aviation Administration (FAA) regulations, 14 Code of Federal Regulations (CFR) Part 77.9, the construction of a transmission line requires FAA notification if a transmission tower height will exceed 200 feet or the height of an imaginary surface extending outward and upward at one of the following slopes:

- A 100:1 slope for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport described in paragraph (d) of 14 CFR Part 77.9 having at least one runway longer than 3,200 feet, excluding heliports;
- A 50:1 slope for a horizontal distance of 10,000 feet from the nearest runway of a public or military airport described in paragraph (d) of 14 CFR Part 77.9 where its longest runway is no longer than 3,200 feet in length, excluding heliports; or

- A 25:1 slope for a horizontal distance of 5,000 feet for heliport described in paragraph (d) of 14 CFR Part 77.9.

Paragraph (d) of 14 CFR Part 77.9 includes public-use airports listed in the Airport/Facility Directory (currently the Chart Supplement), public-use or military airports under construction, airports operated by a federal agency or Department of Defense (DoD), or an airport or heliport with at least one FAA approved instrument approach procedure.

Notification is not required for structures that will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in a congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation.

The PUC CCN application requires listing private airports within 10,000 feet of any alternative route centerline. Following PUC approval of a route for the proposed transmission line, LCRA TSC and AEP Texas will make a final determination of the need for FAA notification, based on specific structure locations and design. If any of the FAA notification criteria are met for the approved route, a Notice of Proposed Construction or Alteration, FAA Form 7460-1, will be completed and submitted to the FAA Southwest Regional Office in Fort Worth, Texas, at least 30 days prior to construction. The result of this notification, and any subsequent coordination with the FAA, could include changes in line design and/or potential requirements to mark and/or light the structures.

1.3.5 United States Department of Defense Siting Clearing House

The DoD Siting Clearinghouse works with industry to overcome risks to national security while promoting compatible domestic energy development. Energy production facilities and transmission projects involving tall structures, such as electrical transmission towers, may degrade military testing and training operations. The electromagnetic interference from electricity transmission lines can impact critical DoD testing activities. 16 TAC § 22.52 states that upon filing of the application, the DoD shall be notified and an affidavit attesting to the notification shall also be provided with the application. The DoD shall also be provided written notice of the public meeting and if a public meeting is not held, the DoD shall be noticed of the planned filing of the application prior to the completion of the routing study. On January 29, 2018, the DoD was contacted about the Proposed Project to provide notification and to solicit any input from the DoD about the Proposed Project. In addition, on June 22, 2018 and in accordance with 16 TAC § 22.52 (a)(4), public meeting notice was mailed to the DoD Siting Clearinghouse for the public

meeting that was held for the Proposed Project on July 12, 2018. A notice of the filing of the application will be sent to the DoD Siting Clearinghouse when the CCN amendment application is filed with the PUC.

1.3.6 Texas Parks and Wildlife Department

The Texas Parks and Wildlife Department (TPWD) is the state agency with the primary responsibility for protecting the state's fish and wildlife resources in accordance with Texas Parks and Wildlife Code § 12.0011(b). POWER solicited comment from TPWD during the project scoping phase of the Proposed Project, and a copy of this EA will be submitted to TPWD when the CCN amendment application is filed with the PUC. Once the PUC approves a route, additional coordination with TPWD may be necessary to determine the need for any additional surveys, and to avoid or minimize any potential adverse impacts to sensitive habitats, threatened or endangered species, and other state regulated fish and wildlife resources.

1.3.7 Texas Commission on Environmental Quality

The Texas Commission on Environmental Quality (TCEQ) is the state agency with the primary responsibility for protecting the state's water quality. The construction of the Proposed Project will require a Texas Pollution Discharge Elimination System General Construction Permit (TXR150000) as implemented by the TCEQ under the provisions of Section 402 of the CWA and Chapter 26 of the Texas Water Code. More than five acres of land disturbance is anticipated during construction of the Proposed Project for all alternative routes, therefore the construction will be considered a "Large Construction Project" under the TXR150000 General Construction Permit. A Stormwater Pollution Prevention Plan (SWPPP) will be developed and implemented during construction activities, a site notice will be posted, and notification sent to the Municipal Separate Sewer System Operator (if applicable). The submittal of a Notice of Intent (NOI) and Notice of Termination to the TCEQ is also required.

1.3.8 Texas Historical Commission

Cultural resources are protected by federal and state laws if they have some level of significance under the criteria of the National Register of Historic Places (NRHP) (36 CFR Part 60) or under state guidance (TAC, Title 13, Part 2, Chapter 26.7-8). The Texas Historical Commission (THC) was contacted by POWER to identify known cultural resource sites within the study area boundary. POWER also reviewed Texas Archeological Research Laboratory (TARL) records for known locations of cultural resource sites. Once a route is approved by the PUC, additional coordination with the THC and University Lands might determine the need for archeological surveys or additional permitting requirements (e.g., cultural resources investigations on University Lands require the issue of a Texas Antiquities Permit prior to

inception of the work). Even if no additional surveys are required, LCRA TSC and AEP Texas propose to implement an unanticipated discovery procedure during construction activities. If artifacts are discovered during construction, activities will cease near the discovery, and LCRA TSC and AEP Texas will notify the State Historic Preservation Office and University Lands for additional consultation.

1.3.9 Texas Department of Transportation

Where a route for the Proposed Project crosses or requires access from a state-maintained road or highway, LCRA TSC or AEP Texas will obtain a permit from the Texas Department of Transportation (TxDOT) prior to construction if that route is ultimately approved by the PUC. Where a route for the Proposed Project is parallel to TxDOT roads, LCRA TSC and AEP Texas intend to place transmission line structures on adjacent private property and not within the road ROW. LCRA TSC and AEP Texas do not propose to place any structures of the Proposed Project within any TxDOT ROW for reasons including, but not limited to, safety, reliability, and compliance with the Texas Administrative Code, specifically TxDOT's Utility Accommodation Rules.

POWER notified TxDOT of the Proposed Project regarding any roadway projects that might be impacted by a potential route. If the route approved by the PUC crosses TxDOT ROW, it will be constructed in accordance with the rules, regulations, and policies of TxDOT. Best Management Practices (BMPs) will be used as required to minimize erosion and sedimentation resulting from construction. Revegetation will occur as required under the "Revegetation Special Provisions" and contained in TxDOT Form 1023 (Rev. 9-93). Traffic control measures will comply with applicable portions of the Texas Manual of Uniform Traffic Control Devices.

1.3.10 University Lands

University Lands owns a significant amount of property in the central and eastern half of the study area. LCRA TSC and AEP Texas coordinated with University Lands during the development of preliminary route segments to minimize impacts on property owned by University Lands. University Lands' staff had input into these segments and approved all final routing of all the primary route segments located on University Lands property.

1.3.11 Texas General Land Office

The Texas General Land Office (GLO) requires a miscellaneous easement (ME) for ROWs within any state-owned riverbeds or navigable streams or tidally influenced waters. Following PUC approval of a route for the proposed transmission line, LCRA TSC and AEP Texas will determine whether state-owned

riverbeds or navigable streams are crossed by the approved routing and coordinate with the GLO as necessary.

The Texas Land Commissioner administers the Texas Coastal Management Program (CMP) under the GLO, which has the responsibility for implementing the Texas CMP. This program intends to help ensure the environmental and economic well-being of the Texas coast through proper management of coastal natural resource areas. The Texas CMP has federal and state project and permit action review processes to evaluate consistency with the program. The Proposed Project is not located within the Coastal Management Zone and no permitting action will be required under this program.

1.4 DESCRIPTION OF PROPOSED DESIGN AND CONSTRUCTION

1.4.1 Transmission Line Design Considerations

The Proposed Project will be designed, constructed, and operated as a double-circuit 345-kV transmission line with bundled 1926.9 thousand circular mils (kcmil) aluminum conductor, steel-supported (ACSS) "Cumberland" and one fiber optic ground wire (OPGW) on the LCRA TSC half of the Proposed Project and with bundled 1590 ACSS and one OPGW being installed on the AEP Texas half of the Proposed Project. The transmission line will be installed on new steel lattice tower structures within new easements.

The Proposed Project will be rated for operation at 5028 Amperes, yielding a nominal 3,005-Megavolt-amperes (MVA) capacity. The configurations of the conductors and shield wires will provide adequate clearance for operation at 345-kV, considering icing and wind conditions applicable to Pecos County. The Proposed Project will be designed and constructed to meet or exceed the specifications set forth in the current edition of the National Electrical Safety Code (NESC) and will comply with all applicable state and federal statutes and regulations. The results of the Natural/Cultural Resource Assessments will be considered when designing and placing new structures.

1.4.2 Typical Transmission Line Structures and Easements

For all segments of the proposed routing, LCRA TSC and AEP Texas propose to use 345-kV double-circuit capable lattice tower structures for typical tangent, angle, and deadend structures. The geometries of the proposed typical tangent, angle, and deadend structures are shown on Figures 1-3 through 1-5. All structure geometries are illustrative. In some areas, such as transmission line crossings and highway crossings, shorter than typical, taller than typical, or alternative structure types may be utilized. Actual structure types may differ slightly based on newer or different designs available at the time of construction.

The new double-circuit 345-kV transmission facilities will typically be constructed on new ROW within easements approximately 150 feet in width, and using typical spans that range from approximately 900 to 1,500 feet. In some areas, actual spans could be more or less than the typical estimated spans, depending upon terrain and other engineering constraints. Easement widths could also vary to address similar concerns. Access easements and/or temporary construction easements may be needed in some areas.

1.4.3 Stations

The Proposed Project will connect one existing 345-kV station and one 138-kVstation to the existing 345-kV electric transmission grid. One of the connections of the Proposed Project will be to the LCRA TSC Bakersfield Station and the other connection will be to a new 345-kV expansion station adjacent to the 138-kV AEP Texas Solstice Switch Station.

The Bakersfield Station and Solstice Switch Station will both be expanded to accommodate facilities associated with the Proposed Project. No additional land is required at the Bakersfield Station, but there will be additional land required at the Solstice Switch Station to terminate the Proposed Project. The following major electric facilities will be required to connect the Proposed Project to the grid:

Bakersfield Station

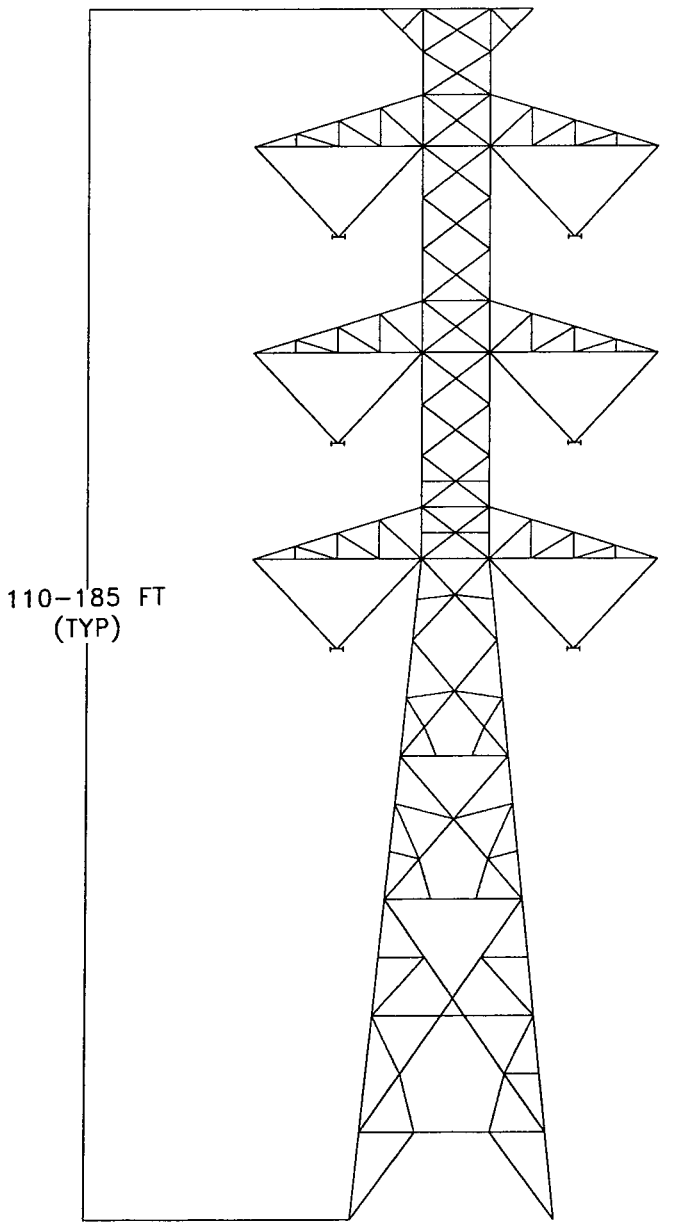
- station A-frame structures
- transmission line circuit breakers
- switches
- transmission line surge arresters
- transmission line capacitance coupled voltage transformer (CCVTs)
- transmission voltage level (345-kV) electric bus
- related line termination facilities

Solstice Switch Station

- two 600 MVA 345/138-kV autotransformers
- reactors
- station A-frame structures
- transmission line circuit breakers
- switches
- transmission line surge arresters

- transmission line CCVTs
- transmission voltage level (345-kV and 138-kV) electric buses
- related line termination facilities

The 345-kV line termination facilities (switches and circuit breakers) will be sized to accommodate the capacity of the new transmission line.



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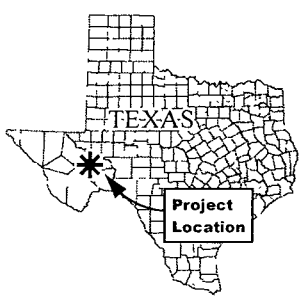

Figure 1-3

Typical Double-Circuit 345-kV Tangent

Bakersfield to Solstice
345-kV Transmission Line Project

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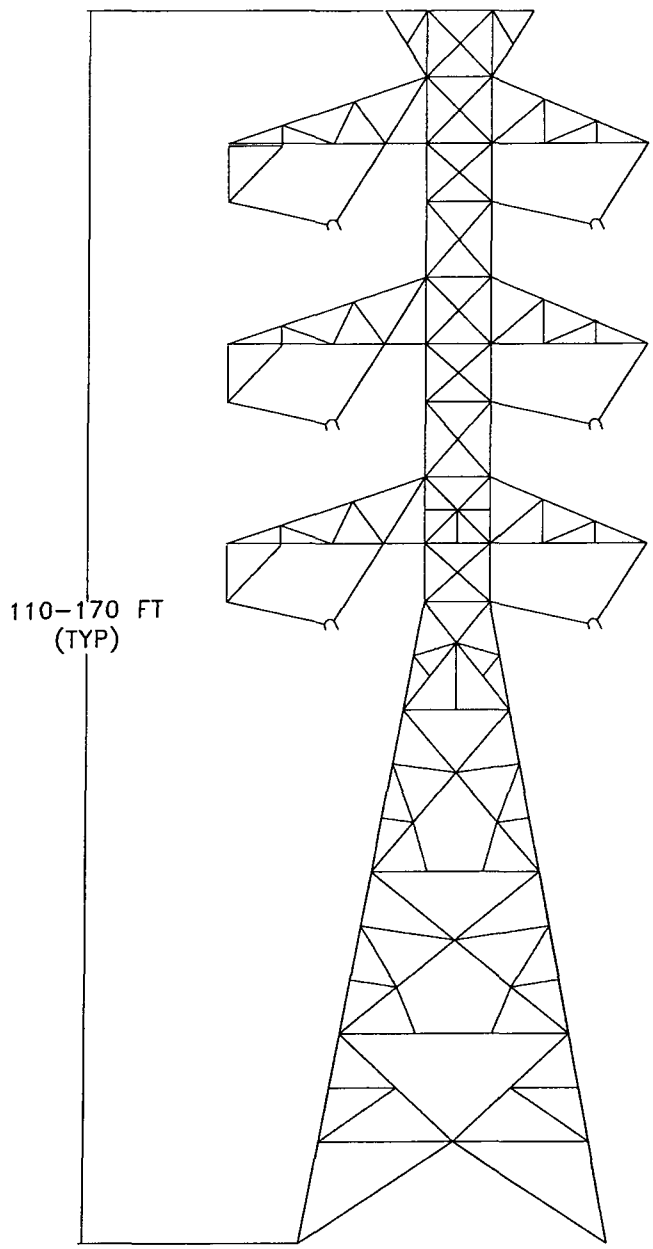

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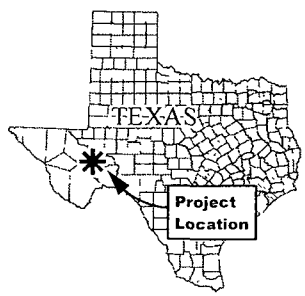


Figure 1-4

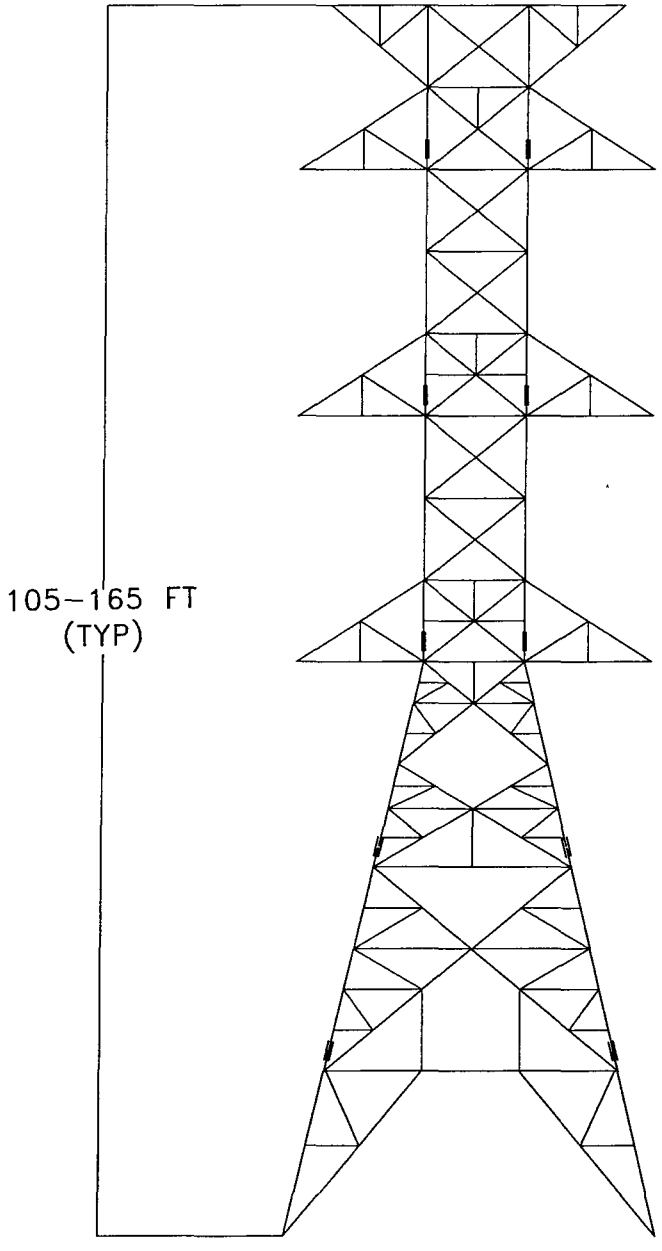
Typical Double-Circuit 345-kV Angle

Bakersfield to Solstice
345-kV Transmission Line Project

POWER ENGINEERS

AMERICAN ELECTRIC POWER

LCRA



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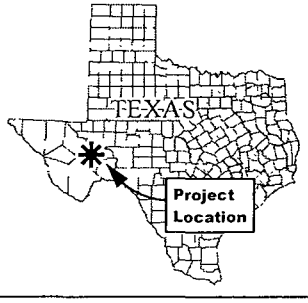

Figure 1-5

Typical Double-Circuit 345-kV Deadend

Bakersfield to Solstice
345-kV Transmission Line Project

POWER ENGINEERS

AMERICAN ELECTRIC POWER

LCRA

1.5 TRANSMISSION LINE CONSTRUCTION CONSIDERATIONS

Construction of the Proposed Project will require removal of vegetation, excavating for installation of foundations, structure assembly and erection, conductor and shield wire installation, and cleanup when construction is complete.

After alignments and structure locations/heights are set, construction specifications will be prepared and construction will be conducted with attention to the conservation of natural and cultural resources. LCRA TSC and AEP Texas will utilize the following criteria to attain this goal:

1. Efforts will be made to avoid oil spills and other types of pollution, particularly while performing work in the vicinity of streams, ponds, and other water bodies.
2. Water used for construction purposes will not typically be taken from streams or other bodies of water. Should water from streams be necessary, its use will be limited to volumes that will not cause harm to the ecology or aesthetics of the area.
3. Precautions will be taken to prevent the possibility of accidentally starting range fires, in compliance with local fire laws and applicable regulations.
4. Tension stringing of conductors will be employed where possible to reduce the amount of vegetation removal. Helicopters may be considered for use in some areas, potentially including areas where clearing may be difficult or particularly impactful to the environment.
5. When practical, in areas of known endangered or threatened species habitat and in consultation with the USFWS, construction will be performed during seasons of low occurrence or during the non-breeding season (species dependent).
6. The Proposed Project will comply with the TCEQ construction general permit for storm water discharges.
7. If any previously unassessed archeological materials are uncovered during construction, construction will cease in the immediate area of the discovery, and LCRA TSC or AEP Texas will take appropriate actions consistent with those previously described in Section 1.3.
8. ROW preparation will be performed in accordance with the provisions discussed below, in order to diminish soil disturbance during construction.

1.5.1 Right-of-Way Preparation

Trees and brush in the ROW are removed where necessary to ensure safe operation of and access to the line.

Existing and new ROW will be primarily used for access during construction operations. Ingress and egress through private property may be required in limited circumstances to reduce construction impacts. In the event ingress and egress through private property is necessary, existing private roads will be used where practical. In some cases, culverts may be used to cross creeks and tributaries. Where culverts are not used, creek crossings may consist of rock or cobble placed on the stream bottom. The following factors, thoughtfully implemented and applicable to the Proposed Project, will minimize the potential adverse effects of the Proposed Project on the natural environment:

1. Preparation of the ROW for construction of the transmission line facilities will take into account soil stability, the prevention of silt deposition in water courses, and practical measures for the protection of natural vegetation and protection of adjacent resources, such as natural habitat for wildlife.
2. A flail mower may be used instead of bulldozers with dirt blades, where such use will preserve the cover crop of grass, low-growing brush, and similar vegetation.
3. Vegetation will typically be removed in a straight path.
4. Removal of vegetation and grading of construction areas, such as storage areas or setup sites, will be performed in a manner that will minimize erosion and conform to the natural topography.
5. Vegetation removal will be performed in accordance with construction plans, which will be developed in accordance with natural and cultural resource regulations applicable to the area of construction and in a manner that will diminish scarring of the landscape or silting of streams, while ensuring that the transmission line facilities can be constructed, operated, and maintained safely and in accordance with the construction codes referenced above.
6. Vegetation removal will be performed in a manner that diminishes the amount of flora and fauna disturbed during construction of the transmission line, except to the extent necessary to establish appropriate clearance for the transmission line.
7. Vegetation removal and construction activities, including temporary or permanent access roads in the Waters of the US or in the vicinity of streambeds, will be performed in a manner to minimize damage to the natural condition of the area and in accordance with USACE requirements.
8. Vegetation removal will not be performed until a SWPPP has been prepared and a NOI has been submitted to the TCEQ for the Proposed Project.

9. Erosion control devices will be constructed where necessary to prevent soil erosion in the ROW, in accordance with the SWPPP. Erosion control devices will be maintained and inspections conducted until the site is sufficiently re-vegetated, as required by the SWPPP.
10. Roads will be provided with erosion-control measures, which may include side drainage ditches or culverts in accordance with the SWPPP.
11. Roads will be stabilized if constructed on steep slopes. Where feasible, service and access roads will be constructed jointly.
12. In or near areas where ROWs enter dense vegetation and cross major highways or rivers of high scenic value, a screen of natural vegetation may be left in the ROW while still allowing for access to the ROW.

1.5.2 Construction

Survey crews will stake or otherwise mark structure locations. Soil borings and soils testing will provide the parameters for foundation designs for new structures. Construction crews will install foundations for the lattice structures. After foundations have cured sufficiently, crews will set structures. Following structure erection, crews will install the conductor and shield wire suspension assemblies. Conductor suspension assemblies may include porcelain and/or polymer insulators. Structure grounds will be installed using external ground rods. In some areas, avian-perching deterrents will be installed above suspension assemblies.

Although vehicular traffic is a very large part of this operation, construction crews will take care to limit damage to the ROW by minimizing the number of pathways traveled.

1.5.3 Conductor and Shield Wire Installation

Conductor, also referred to as wire and shield wires (for lightning protection), will be installed via a tensioning system. Tensioning systems typically use ropes threaded through stringing blocks or dollies for each conductor and shield wire. Conductor and shield wires will be pulled by the ropes and held tight by a tensioner to keep the wires from coming in contact with the ground and other objects that could damage the wire. In addition, guard structures (temporary wood-pole structures) will be installed where the transmission line crosses overhead electric power lines, overhead telephone lines, roadways, or other areas requiring an additional margin of safety during wire installation. After the wire is tensioned to the required sag, the wire will be taken out of the blocks and placed in the suspension and dead-end clamps for permanent attachment.

1.5.4 Cleanup

The cleanup operation involves stabilizing disturbed areas, removal of debris, and the restoration of items damaged by construction of the Proposed Project. The following criteria will guide the cleanup of construction debris and restoration of the area's natural setting. Further requirements may be imposed by land management agencies.

1. Construction equipment, supplies, and LCRA TSC or AEP Texas (or contractor) property will be dismantled and removed from the ROW when construction is complete.
2. Construction waste, with the possible exception of cleared vegetation, will be removed prior to completion of the Proposed Project.
3. If cleared vegetation is mulched, it may be spread out over the ROW, given to the landowner or a nursery as a product for beneficial use, or picked up and taken to a landfill.
4. Burning is not typically conducted, but may be used as a means of disposal, if no practical alternative exists. Any material to be burned will be piled in a manner and in locations that will cause the least fire risk. Care will be taken to prevent fire or heat damage to trees, shrubs, and structures adjacent to the ROW and station. Burning will conform to local fire and air quality regulations.
5. Soil that has been excavated during construction and not used will be evenly backfilled onto a cleared area, spread to conform to the terrain and the adjacent land, or removed from the site.
6. Replacement of soil adjacent to water crossings for access roads will be at slopes less than the normal angle of repose for the soil type involved.
7. If temporary roads are used, they will be removed and the original slopes restored and re-vegetated as required by the SWPPP.
8. If natural re-vegetation will not provide ground cover in a reasonable length of time, seeding, sprigging or hydro-seeding of restored areas may be used to encourage growth of grasses and other vegetation that is ecologically desirable.
9. Where site factors make it unusually difficult to establish a protective vegetative cover, other restoration procedures may be advisable to prevent erosion, such as the use of gravel, rocks, or concrete.
10. LCRA TSC and AEP Texas will return each affected landowner's property to its original contours and grades unless otherwise agreed to by the landowners' representatives. However, neither LCRA TSC nor AEP Texas will restore a landowner's property to its original contours and grades if doing so will affect the safety or stability of the Proposed Project's structures or the safe operation and maintenance of the line.

1.6 TRANSMISSION LINE MAINTENANCE

Periodic inspection of the ROW, structures, and line will be performed by LCRA TSC or AEP Texas in order to provide for the safe and reliable operation of the transmission line. Preservation of the environmental, natural, and cultural resource conservation factors, designed and built into transmission system siting, require a thoughtful, comprehensive program for maintaining the facilities. The following factors will be incorporated into the maintenance program for this project.

1. Native vegetation, particularly that of value to fish and wildlife, that has been preserved during the construction process and that does not impede access nor have the potential to grow close enough to the transmission line to pose a hazard to the safe operation and maintenance of the transmission line, will be allowed to grow in selected parts of the ROW.
2. Once a cover of vegetation has been established, it will be properly maintained to ensure public safety and a reliable, functioning transmission system.
3. Access roads and service roads, where practical, will be maintained with native grass cover. Where grading is necessary, access and service roads will be graded to the proper slope in order to prevent or diminish soil erosion.
4. If used, United States Environmental Protection Agency (USEPA) approved herbicides will be carefully selected and carefully applied in a manner that will diminish effects on desirable indigenous plant life, and selective application will be used whenever appropriate. To preserve the natural environment, it is essential that herbicides be applied in a manner fully consistent with the protection of the entire environment, particularly the health of humans and wildlife.
5. Maintenance inspection intervals will be established by LCRA TSC and AEP Texas and routine maintenance will be conducted, when possible, while access roads are firm or dry.
6. Aerial and ground maintenance inspection activities of the transmission line facility will include observation of soil erosion problems, fallen timber, and conditions of the vegetation that require attention. As an erosion-control measure, native shrubs, forbs, or grasses may be planted.
7. Transmission line ROW can be used for appropriate types of multiple-use concepts, such as trails suitable for hiking, biking, bird watching, farming, ranching and livestock grazing, wildlife production, and recreational or commercial hunting operations, as long as the activity does not impact public safety or inhibit safe operation and maintenance of the electrical system.

1.7 STATION SITE CONSTRUCTION CONSIDERATIONS

For the Bakersfield Station, construction of the Proposed Project includes expanding the station within the existing station property and the installation of the new facilities. For the Solstice Switch Station, construction of the Proposed Project includes expanding the station and acquiring property for the installation of the new facilities. At each station, the site pad, perimeter fence, and ground grid will be expanded. Electrical equipment, support structures, and foundations will be installed to accommodate the Proposed Project. After all facilities are installed, a final surface layer of gravel will be added in the area of the new facilities and cleanup will occur when construction is complete.

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2.0 DESCRIPTION OF THE STUDY AREA

2.1 Routing Study Methodology

The objective of this EA was to develop alternative routes that provide geographic diversity and comply with § 37.056(c)(4)(A)-(D) of the Texas Utilities Code, 16 TAC § 22.52 (a)(4), and 16 TAC § 25.101(b)(3)(B), including the PUC's policy of prudent avoidance. The study methodology utilized by POWER for this EA included study area delineation based on the project endpoints; identification and characterization of existing land use and environmental constraints; and identification of areas of potential routing opportunity located within the study area. POWER identified potentially affected resources and considered each during the route development process. Input from regulatory agencies, local officials, and the public meeting was also considered during the alternative route development process. Modifications and additions of preliminary alternative segments were made while considering resource sensitivities and public input. Feasible and geographically diverse alternative routes were then selected for analysis and comparison using evaluation criteria to determine potential impacts to existing land use and environmental resources. LCRA TSC and AEP Texas will consider all of the certification criteria in PURA and the PUC Substantive Rules, engineering and construction constraints, grid reliability and security issues, and estimated costs. LCRA TSC and AEP Texas will identify one alternative route that they believe best addresses the requirements of PURA and PUC Substantive Rules and will describe such selection in the CCN application. This alternative route, as well as other alternative routes that provide geographic diversity and sufficient routing options, will all be submitted to the PUC in the CCN application.

2.1.1 Study Area Boundary Delineation

The study area is in the vicinity of Fort Stockton in west Texas within Pecos County. The study area set boundaries for the data collection process and was defined to include feasible geographically diverse alternatives for the location of the transmission lines between the project endpoints. Major physiographic features, jurisdictional boundaries, sensitive land uses, and existing utility corridors helped to define the study area boundaries (see Figure 2-1).

The extent of the project endpoints and the study area are described below and illustrated in Figure 2-1. The study area is oriented in an east to west direction with the existing LCRA TSC Bakersfield Station located in the eastern portion of the study area and the existing AEP Texas Solstice Switch Station located in the western portion of the study area. More specifically, the LCRA TSC Bakersfield Station is located northeast of the City of Fort Stockton, west of Farm to Market Road 1901. The AEP Texas Solstice Switch Station is located west of the City of Fort Stockton, north of Interstate Highway 10.

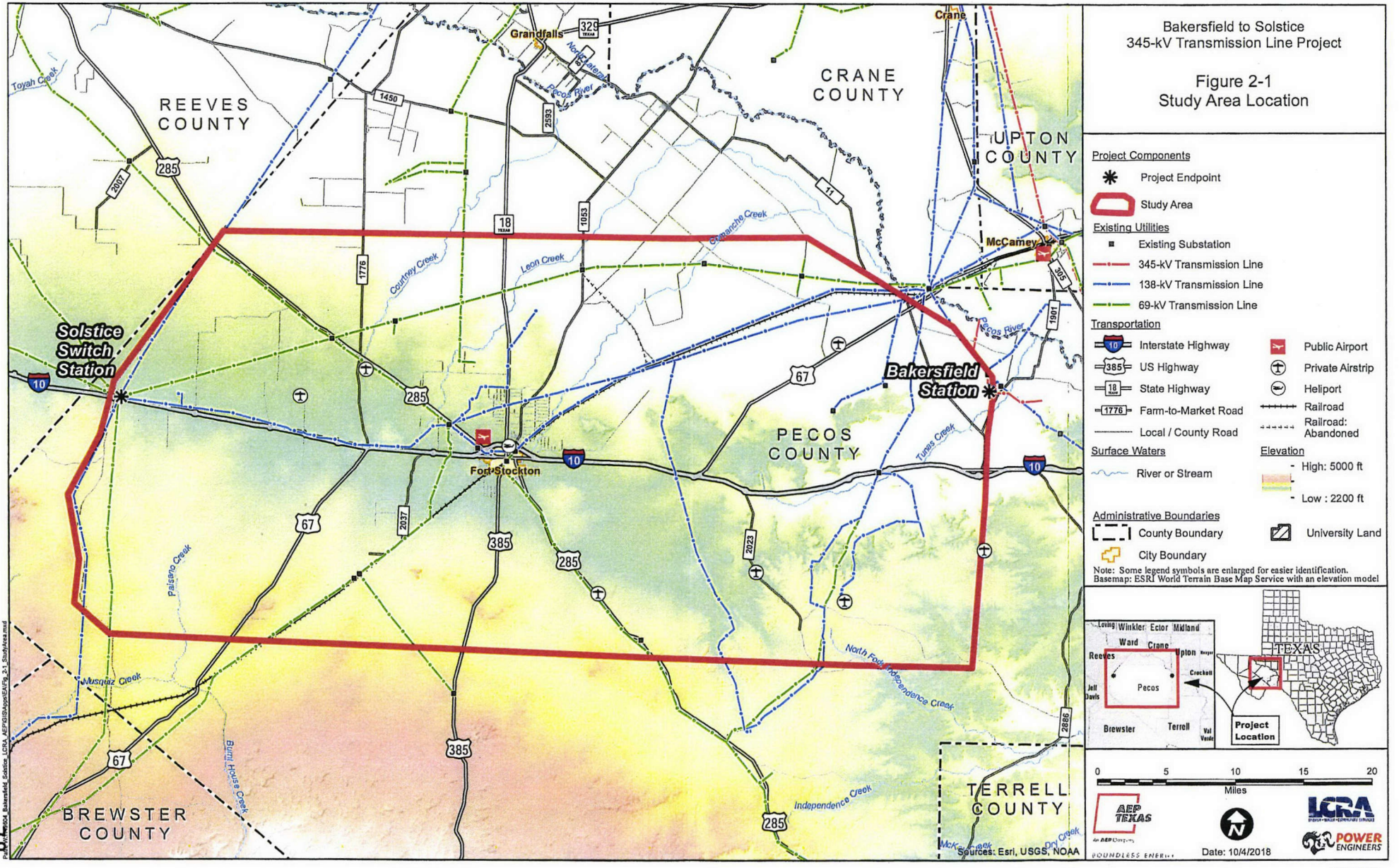
The eastern boundary of the study area is defined by the existing LCRA TSC Bakersfield Station site. The western boundary of the study area is defined by the existing AEP Texas Solstice Switch Station site. The northern and southern study area boundaries are defined to provide adequate space for the development of a set of geographically diverse routing alternatives east to west and the need to minimize land use conflicts within the study area.

2.1.2 Base Map Development

After delineation of the study area, a project base map, overlain on United States Geological Survey (USGS) 7.5-minute topographic maps and aerial photography, was prepared and used to display resource data for the project area. Resource data categories and factors that were determined appropriate for interpretation and analysis were selected and mapped. The base map provides a broad overview of various resource locations indicating obvious routing constraints and areas of potential routing opportunities.

Data displayed on the base map includes:

- Major land jurisdictions and uses.
- Major roads (including county roads [CRs], farm-to-market roads [FMs], United States Highways [US Hwys], State Highways [SHs], and Interstate Highways [IHs]).
- Existing transmission line and pipeline corridors.
- Airports, private airstrips and communication facilities.
- Parks and wildlife management areas.
- Major political subdivision boundaries.
- Lakes, reservoirs, rivers, and ponds.


Bakersfield to Solstice
345-kV Transmission Line Project
Figure 2-1
Study Area Location
REEVES COUNTY
CRANE COUNTY
UPTON COUNTY
PECOS COUNTY
BREWSTER COUNTY
TERRELL COUNTY
Solstice Switch Station
Bakersfield Station
Fort Stockton
Grandfalls
Crane
McCamey
Toyah Creek
Pecos River
North Lateral
Comanche Creek
Courtney Creek
Leon Creek
Tunas Creek
Musquiz Creek
Paisano Creek
Blumhouse Creek
North Fork Independence Creek
Independence Creek
McKenzie Creek
Dry Creek
Project Components
Project Endpoint
Study Area
Existing Utilities
Existing Substation
345-kV Transmission Line
138-kV Transmission Line
69-kV Transmission Line
Transportation
Interstate Highway
US Highway
State Highway
Farm-to-Market Road
Local / County Road
Public Airport
Private Airstrip
Heliport
Railroad
Railroad: Abandoned
Surface Waters
River or Stream
Elevation
High: 5000 ft
Low : 2200 ft
Administrative Boundaries
County Boundary
City Boundary
University Land
Note: Some legend symbols are enlarged for easier identification.
Basemap: ESRI World Terrain Base Map Service with an elevation model
Loving Winkler Ector Midland
Ward Crane Upton
Reeves
Jeff Davis
Pecos
Crockett
Brewster
Terrell
Val Verde
TEXAS
Project Location
0 5 10 15 20
Miles
Sources: Esri, USGS, NOAA
Date: 10/4/2018
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2.1.3 Evaluation Criteria

Land use and environmental evaluation criteria were developed to reflect accepted practices for routing electric transmission lines in the state of Texas (see Table 2-1). Emphasis was placed on acquiring information identified in § 37.056(c)(4)(A)-(D) of the Texas Utilities Code, 16 TAC § 25.101, including the policy of prudent avoidance, and the PUC CCN application form requirements. Evaluation criteria were further refined based on data collection, reconnaissance surveys, and public input. The alternative route development process was conducted with consideration and incorporation of the evaluation criteria.

Evaluation criteria data were reviewed, tabulated, and compared (see Section 4.0) for each resulting primary alternative route and, among other factors, were ultimately used for the delineation of a reasonable number of geographically diverse alternative routes from an environmental and land use perspective.

TABLE 2-1 LAND USE AND ENVIRONMENTAL CRITERIA FOR ALTERNATIVE ROUTE EVALUATION

	LAND USE
1.	Length of primary alternative route (miles)
2.	Number of habitable structures[1] within 500 feet of ROW centerline
3.	Length of ROW using existing transmission line ROW
4.	Length of ROW parallel and adjacent to existing transmission line ROW
5.	Length of ROW parallel and adjacent to existing 345-kV transmission line ROW
6.	Length of ROW parallel and adjacent to existing 138-kV transmission line ROW[2]
7.	Length of ROW parallel and adjacent to existing 69-kV transmission line ROW
8.	Length of ROW parallel and adjacent to other existing ROW (roadways, railways, etc.)
9.	Length of ROW parallel and adjacent to apparent property lines[3]
10.	Sum of evaluation criteria 4, 8, and 9
11.	Percent of evaluation criteria 4, 8, and 9
12.	Length of ROW across parks/recreational areas[4]
13.	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline
14.	Length of ROW across University Lands
15.	Length of ROW through cropland
16.	Length of ROW through pasture/rangeland
17.	Length of ROW through land irrigated by traveling systems (rolling or pivot type)
18.	Length of ROW parallel and adjacent to exiting natural gas pipelines (6" diameter or greater)[4]
19.	Number of pipeline crossings[5]
20.	Number of transmission line crossings
21.	Number of IH, US Hwy, and SH crossings
22.	Number of FM road crossings
23.	Number of cemeteries within 1,000 feet of the ROW centerline
24.	Number of FAA registered public/military airports[6] with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline

TABLE 2-1 LAND USE AND ENVIRONMENTAL CRITERIA FOR ALTERNATIVE ROUTE EVALUATION

25.	Number of FAA registered public/military airports[6] having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline
26.	Number of private airstrips within 10,000 feet of the ROW centerline
27.	Number of heliports within 5,000 feet of the ROW centerline
28.	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline
29.	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline
	AESTHETICS
30	Estimated length of ROW within foreground visual zone[7] of IH, US Hwys, and SHs
31.	Estimated length of ROW within foreground visual zone[7] of FM roads
32.	Estimated length of ROW within foreground visual zone[7,8] of parks/recreational areas[4]
	ECOLOGY
33.	Length of ROW through upland woodlands/brushland
34.	Length of ROW through bottomland/riparian woodlands
35.	Length of ROW across NWI mapped wetlands
36.	Length of ROW across known habitat of federally listed endangered or threatened species
37.	Length of ROW across open water (lakes, ponds)
38.	Number of stream crossings
39.	Number of river crossings
40.	Length of ROW parallel (within 100 feet) to streams or rivers
41.	Length of ROW across 100-year floodplain
	CULTURAL RESOURCES
42.	Number of recorded cultural resource sites crossed by ROW
43.	Number of additional recorded cultural resource sites within 1,000 feet of ROW centerline
44.	Number of NRHP listed properties crossed by ROW
45.	Number of additional NRHP listed properties within 1,000 feet of ROW centerline
46.	Length of ROW through areas of high archaeological site potential

NOTES.
[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 500 feet of the centerline of a transmission project of 230-kV or more.
[2]The data associated with paralleling 138-kV transmission lines includes an existing 69-kV transmission line that is being upgraded for operation at 138-kV prior to the completion of the Proposed Project.
[3]Apparent property boundaries created by existing roads, highways, or railroad ROWs are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria.
[4]Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.
[5]Only pipelines six inches and greater in diameter carrying petrochemicals were quantified in the pipeline crossing and paralleling calculations
[6]As listed in the Chart Supplement South Central U.S. (FAA 2018a formerly known as the Airport/Facility Directory South Central U S) and FAA 2018b.
[7]One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of interstates, US and SH criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM roads criteria
[8]One-half mile, unobstructed Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of interstates, US Hwy and SH criteria and/or with the total length of ROW within the visual foreground zone of FM roads criteria

2.1.4 Data Collection and Constraints Mapping

Several methodologies were utilized to collect and review environmental and land use data, including incorporation of readily available Geographic Information System (GIS) coverage with associated metadata; review of maps and published literature; review of files and records from numerous federal,

state, and local regulatory agencies; meetings with stakeholders; and reconnaissance surveys of the study area. Data collected for each resource area were mapped within the study area utilizing GIS layers.

Maps and data layers reviewed include USGS 7.5-minute topographic maps (USGS 2018a), NWI maps, FEMA floodplain data (FEMA 2018), Texas Natural Resources Information System (TNRIS), Railroad Commission of Texas ([RRC] 2018a), TXNDD, and TxDOT county highway maps. Appraisal district parcel boundary data for Pecos County was provided by LCRA TSC and was used to identify apparent property boundaries as potential paralleling opportunity areas. Refined and updated parcel boundary information was also provided by aerial photography (Photo Science 2018) and were used as the background for several of the scaled project maps, including the initial base map, the field maps, the public involvement display boards, and the environmental and land use constraints maps.

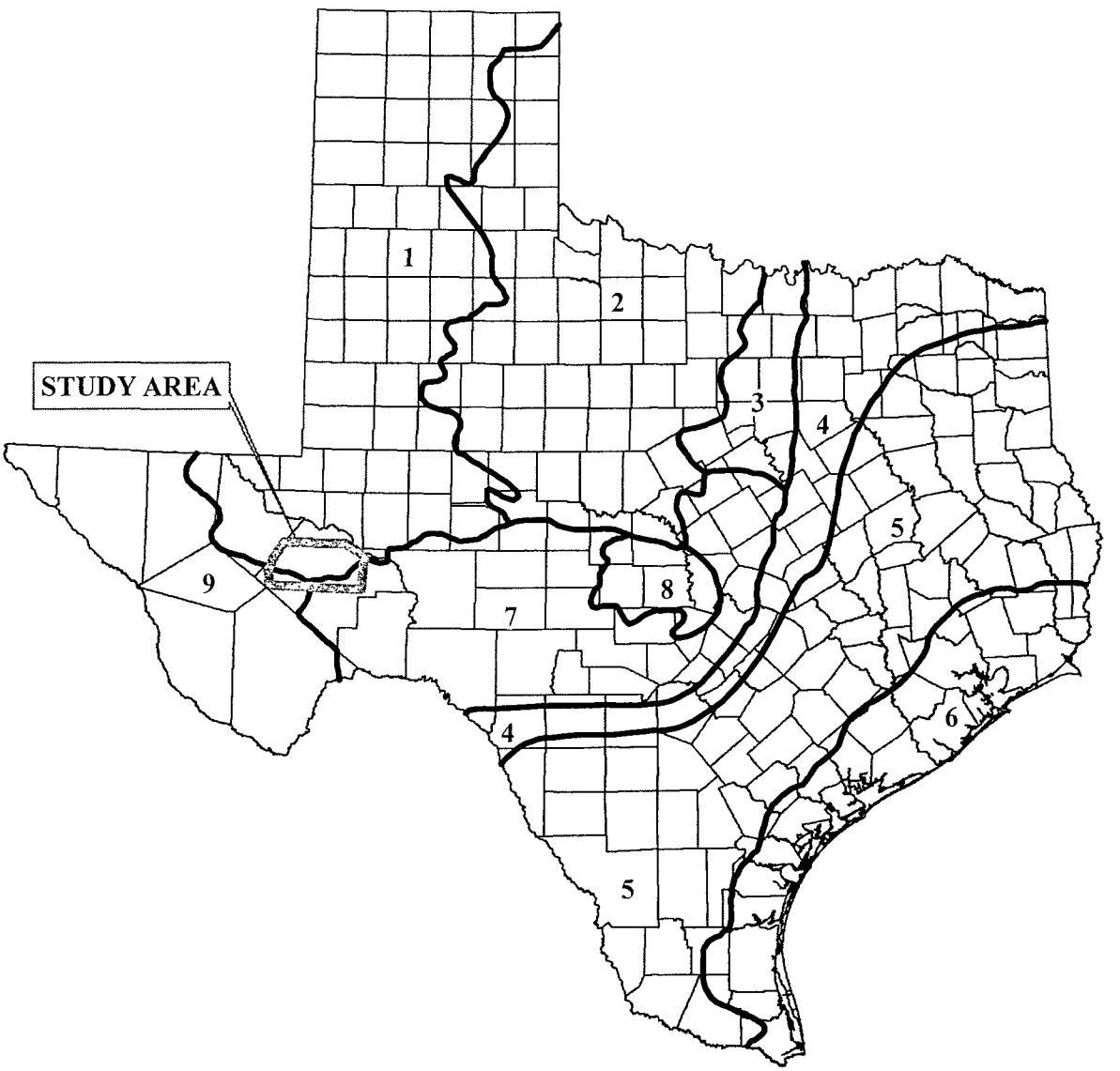
2.1.5 Reconnaissance Surveys

Reconnaissance surveys of the study area were conducted by POWER personnel from publicly accessible areas to confirm the findings of the research and data collection activities, identify changes in land use occurring after the date of available aerial photography, and to identify potential unknown constraints that might not have been previously noted in the data. Reconnaissance surveys of the study area were conducted on March 27 and 28, 2018 and July 12 and 13, 2018.

2.2 Environmental Integrity

2.2.1 Physiography and Geology

As shown in Figure 2-2, the study area is primarily located within the southern portion of the High Plains, the northwest portion of the Edwards Plateau, and the southeast portion of the Basin and Range Physiographic Provinces (Bureau of Economic Geology [BEG] 1996). The southern High Plains region is described as nearly flat with playa lakes and local dune fields with elevations ranging from 2,200 feet to 3,800 feet above mean sea level (amsl). The Edwards Plateau region is described as a flat upper surface with box canyons with elevations ranging from 450 feet to 3,000 feet amsl (BEG 1996). The Basin and Range region is characterized by north and south facing mountains and basins with elevations ranging from 1,700 feet to 8,750 feet amsl. Elevations in the study area range between approximately 2,300 feet amsl near the Pecos River in the northeast portions of the study area to approximately 3,600 feet on the hilltops and mesas in the southern portions of the study area (BEG 1996).



N
W E
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0 25 50 100 150 200 250

Miles

Source: Texas Bureau of Economic Geology, 1996

Legend

Physiographic Region Boundary
1 High Plains
2 North-Central Plains
3 Grand Prairie
4 Blackland Prairies
5 Interior Coastal Plains
6 Gulf Coastal Prairies
7 Edwards Plateau
8 Central Texas Uplift
9 Trans-Pecos Basin and Range

County Boundary

Figure 2-2

LOCATION OF THE STUDY AREA IN RELATION TO THE PHYSIOGRAPHIC REGIONS OF TEXAS

Bakersfield-Solstice 345-kV Transmission Line Project

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The BEG (1976 and 1994) geologic atlas maps (Pecos and Fort Stockton Sheets) were reviewed for geologic formations that occur within the study area. Geologic formations occurring within the study area primarily include the Cretaceous-aged Washita and Fredericksburg Groups, and Quaternary-aged deposits.

Cretaceous Aged Formations

Cretaceous-aged Washita and Fredericksburg Groups are often undivided and may also include portions of the Buda and Segovia Formations. The Washita Group is characterized by thick alternative units of clay and limestone up to 200 feet thick. This group may also contain claystone, mudstone, and marine fossils. The Fredericksburg Group is generally comprised of limestone and dolomite with chert in thin layers or nodules and locally gypsiferous marl. This formation may be approximately 60 to 350 feet thick (USGS 2018b).

Quaternary Aged Formations

Quaternary aged rock groups within the study area include alluvium, quaternary deposits, fan deposits, and fluviatile terrace deposits. These deposits are found scattered throughout lower portions of the study area. These groups are more recent and may be located above the floodplain in areas with frequent flooding along the rivers, creeks, streams, and draws. Alluvium and quaternary deposits may contain sand, clay, silt, sand, gravel and organic matter. Fan deposits may also form and include colluvium soils and older Quaternary deposits. Fluviatile terrace deposits may contain sand, silt, clay, gravel, and caliche (USGS 2018b).

Geologically Significant Features

Several potential significant features affecting construction and operation of the transmission line were reviewed within the study area. Potentially hazardous areas reviewed include karst areas with known cave locations, fault lines, historical coal/uranium mining locations and subsurface contamination.

Cave and karst data were collected from a variety of sources including the Texas Speleological Survey ([TSS] 1994 and 2007). The study area lies within the Stockton Plateau and Isolated Edwards Group Outliers Karst Regions (TSS 2007). Amazing Maze Cave is found in the eastern portion of the study area on the Bakersfield Quadrangle (and is managed by the University of Texas). Comanche Springs Cave was identified within the City of Fort Stockton, Texas on the Fort Stockton East Quadrangle. Review of the USGS data and BEG geologic atlas maps indicates no seismic or Quaternary faults are located within

the study area (USGS 2018c). RRC data were reviewed and no historical or current coal/uranium mining activities are/were within the study area (BEG 2018; RRC 2018a and 2018b).

Subsurface contamination (soils or groundwater) from previous commercial activities or dumps/landfills may require additional considerations during routing and/or may create a potential hazard during construction activities. One active landfill was identified within the study area. The City of Fort Stockton landfill was identified approximately 2.0 miles northeast of the City of Fort Stockton (TCEQ 2018a). Review of USEPA Superfund/National Priority List Sites (USEPA 2018a) and TCEQ State Superfund Sites (TCEQ 2018b) did not indicate any federal or state listed sites within the study area.

2.2.2 Soils

2.2.2.1 Soil Associations

The published Natural Resource Conservation Service ([NRCS] 2018) soil survey and soil surveys for Pecos County (Soil Conservation Service [SCS] 1980) were used to identify and characterize the soil associations that encompass the study area. A soil association is a group of soils geographically associated in a characteristic repeating pattern and defined as a single unit (NRCS 2018). Soil associations occurring within the study area are listed in Table 2-2, which summarizes each soil association identified within the study area and indicates if any mapped units of the soil series within the association are considered prime farmlands and/or hydric soils (NRCS 2018).

TABLE 2-2 MAPPED SOIL ASSOCIATIONS WITHIN THE STUDY AREA

MAP UNIT	DESCRIPTION	SOIL UNIT	PERCENT OF ASSOCIATION	LAND FORM	HYDRIC	PRIME FARMLAND
Ector - Sanderson - Rock Outcrop	Very shallow to shallow and deep, gently sloping to steep gravelly soils; and rock outcrop: on limes-tone hills and in valleys	Ector	48%	Hills and Mountains	No	No
		Sanderson	16%			
		Rock Outcrop	16%			
		Other	20%			
Lozier - Rock outcrop	Very shallow to shallow, rolling to steep very gravelly and stony soils; and rock outcrop; on limestone hills	Lozier	71%	Hills and Mountains	No	No
		Rock Outcrop	14%			
		Other	15%			
Reakor - Upton - Delnorte	Deep and very shallow to shallow nearly level to gently undulating very gravelly and loamy soils, on uplands	Reakor	41%	Uplands	No	No
		Upton	30%			
		Delnorte	10%			
		Other	19%			
Reagan - Hodgins -Iraan	Deep nearly level loamy soils; on uplands and floodplains	Reagan	42%	Uplands	No	Prime farmland if irrigated
		Hodgins	20%			
		Iraan	13%			
		Other	25%			

TABLE 2-2 MAPPED SOIL ASSOCIATIONS WITHIN THE STUDY AREA

MAP UNIT	DESCRIPTION	SOIL UNIT	PERCENT OF ASSOCIATION	LAND FORM	HYDRIC	PRIME FARMLAND
Dalby - Reakor	Deep nearly level clayey and loamy soils; on uplands and outwash plains	Dalby	68%	Uplands	No	No
		Reakor	24%			
		Other	8%			
Balmorhea - Reeves	Deep and moderately deep, nearly level loamy soils; on floodplains and uplands	Balmorhea	51%	Floodplains	No	No
		Reeves	27%			
		Other	22%			

Source: SCS 1980, NRCS 2018

2.2.2.2 Prime Farmland Soils

U.S.C. § 7-4201(c)(1)(A) defines prime farmland soils as those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They have the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. Additional potential prime farmlands are those soils that meet most of the requirements of prime farmland but fail because they lack the installation of water management facilities, or they lack sufficient natural moisture. The United States Department of Agriculture (USDA) would consider these soils as prime farmland if such practices were installed. According to the NRCS Web Soil Survey (NRCS 2018) there are several soil series designated as prime farmland within the study area. The soil associations are listed in Table 2-2.

Typically, the construction of a new transmission line is not considered a conversion of Prime and Important Farmlands because the area within the ROW between the transmission line structures can still be used for agricultural purposes after construction. As a result, no long-term adverse impacts to prime farmland soils are anticipated and without a federal nexus the project would be exempt from the regulations listed under Part 523 - Farmland Protection Policy Act (FPPA) Manual; Subpart B; 523.10,B (8).

The NRCS responded to POWER's solicitation for information in a letter dated February 08, 2018 (Appendix A). The NRCS stated, "The proposed project site may involve areas of Prime Farmland; however, we now consider the installation of transmission lines to be a minimal impact that will have no effect on productive agricultural lands. Due to these reasons, the proposed project is exempt from provisions of FPPA and no further consideration for protection is necessary."

2.2.2.3 Hydric Soils

The National Technical Committee for Hydric Soils defines hydric soils as soils that were formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation (NRCS 2018).

Table 2-2 lists whether there are map unit components that are rated as hydric soils in the study area. Minor soils (Other) within each association were not evaluated for this criterion. According to the NRCS Web Soil Survey Database (NRCS 2018), no major soils within the study area were identified as a hydric soil; however, minor soil components within each soil association may be designated as hydric.

2.2.3 Mineral and Energy Resources

The RRC data, USGS 7.5-minute topographic maps, and aerial photography were reviewed for oil/gas wells, pipelines, wind energy development, and supporting facilities. Multiple oil/gas wells, pipelines, and wind turbines were identified within the study area. Multiple active and historic gravel/caliche quarries/pits were identified within the study area through review of USGS 7.5-minute topographic maps and during field reconnaissance surveys. These features were mapped using GIS and taken into account during the routing process.

2.2.4 Water Resources

2.2.4.1 Surface Water

Water resources evaluated for this study area include lakes, ponds, rivers, streams, and floodplains. Information on water resources within the study area were obtained from a variety of sources including the Texas Water Development Board (TWDB), NHD, USGS (2018c) topographical maps, aerial photographs, and through field reconnaissance.

The study area is located entirely within the Rio Grande River Basin and Lower Pecos River Sub-Basin (USEPA 2018b). The Pecos River (TCEQ Stream Segment: 2311) flows approximately 0.5 mile outside of the northeast corner of the study area. Other named perennial, intermittent, and ephemeral streams within the study area include: Tunas Creek, Comanche Creek, Leon Creek, Courtney Creek, North Fork Independence Creek, Harral Draw, Monument Draw, South Linger Draw, Hole-in-the-Ground Draw, Six-Shooter Draw, Belding Draw, Acebuche Draw, Coyanosa Draw, Hackberry Draw, and Diamond Y Draw. Creeks, draws, and drainages within the study area generally flow in a northeast to east direction, until

their confluence with the Pecos River. Several additional unnamed drainages, ponds, and stock tanks are also within the study area. There are no major reservoirs or rivers within the study area. Review of the TWDB State Water Plan and Regional Water Plan (Region F) did not indicate any proposed reservoir projects within the study area (TWDB 2016 and 2017).

Under 31 TAC § 357.8, TPWD has identified Ecologically Significant Stream Segments (ESSS) based on habitat value, threatened and endangered species, species diversity, and aesthetic value criteria. Review of the TPWD ESSS list identified portions of Diamond Y Springs and Diamond Y Draw (Leon Creek). The basis for this designation includes potential threatened or endangered species/unique communities (TPWD 2018a). Additional information on threatened or endangered species within the study area is discussed in Section 2.6.4.

In accordance with Section 303(d) and 304(a) of the CWA, the TCEQ identifies surface waters for which effluent limitations are not stringent enough to implement water quality standards and for which the associated pollutants are suitable for measurement by maximum daily load. Review of the TCEQ (2014) Texas Integrated Report of Surface Water Quality indicates no surface waters within the study area that meet these water quality standards.

2.2.4.2 Ground Water

The major ground water aquifers mapped within the study area include the Edwards-Trinity and Pecos Valley Aquifers. Minor aquifers identified within the study area include the Captain Reef Complex, Dockum, and Rustler Aquifers. The Edwards-Trinity Aquifer underlies a majority of the study area as well as much of southwestern Texas. Water is contained predominantly within limestone and dolomite of the Edwards Group and sands of the Trinity Group. The average freshwater saturated thickness is approximately 433 feet, with a maximum saturated thickness of over 800 feet. Water quality ranges from fresh to slightly saline, with salinity typically increasing westward within the Trinity Group (TWDB 2011).

The Pecos Valley Aquifer is a major west Texas aquifer occurring north and south of the upper Pecos River Valley. Water is contained predominantly within alluvium and wind-blown deposits, with a thickness of up to 1,500 feet and freshwater saturated thickness averaging 250 feet. A majority of the water harvested from this aquifer is used for agricultural irrigation, but other uses include municipal, industrial, and power generation (TWDB 2011).

Other ground water resources such as public and private water wells and natural springs were identified using TWDB (1975 and 2018) data and USGS topographic maps (USGS 2018c). Several springs and groundwater seeps were identified throughout the study area. These features were mapped using GIS and taken into consideration during the routing process.

2.2.4.3 Floodplains

Federal Emergency Management Agency (FEMA) floodplain mapping data were reviewed for the study area. Based on FEMA Flood Insurance Rate Maps (FIRM), the 100-year floodplain data was not available for the entire study area, but floodplain areas may occur within low lying streams, draws, and associated depressional areas. The 100-year flood (one percent flood or base flood) represents a flood event that has a one percent chance of being equaled or exceeded for any given year (FEMA 2018).

2.2.5 Ecological Resources

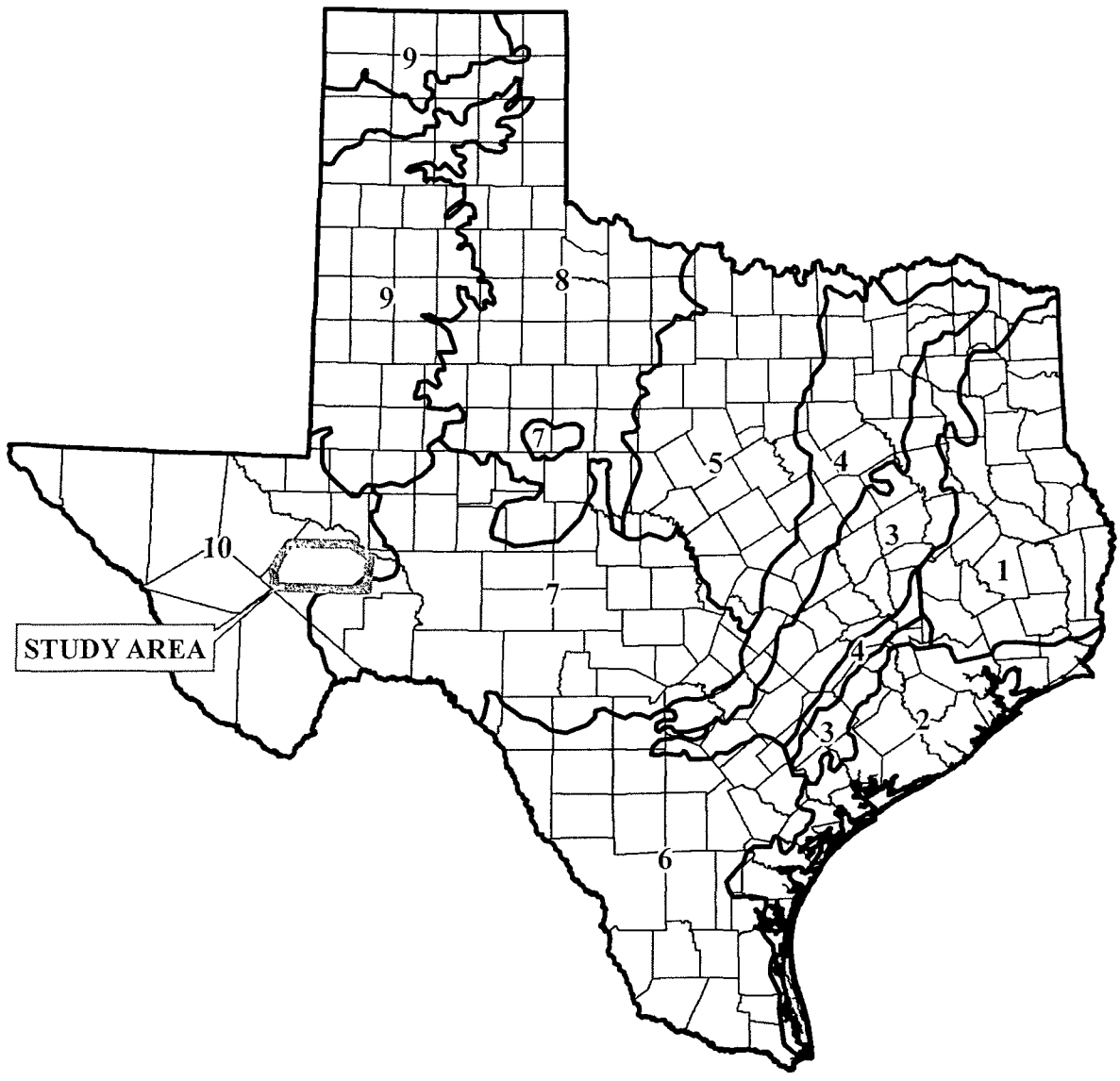
Information on sensitive wildlife and vegetation resources within the study area was obtained from a variety of sources, including correspondence with the USFWS and TPWD. Additional information was obtained from published literature and technical reports. All biological resource data for the study area were mapped using GIS.

For the purpose of this EA, emphasis was placed on obtaining known locations of unique vegetative communities and habitat for special status species that have been previously documented within the study area. Special status species include those listed by the USFWS as threatened, endangered, proposed, or candidate; and those listed by TPWD as threatened, endangered or as a rare species. A GIS file of known occurrences for listed species and/or sensitive vegetative communities was obtained from the TPWD's TXNDD on January 23, 2018. Although the TXNDD (2018) was reviewed, these data do not preclude the potential for a species to exist within the study area. Only a thorough review of existing habitats and/or a species-specific survey could determine the presence or absence of a special status species.

2.2.5.1 Vegetation

As shown in Figure 2-3, the study area is primarily located in the eastern portion of the Trans-Pecos Vegetational Area (Gould 1960). The southeast corner of the study area lies within the Edwards Plateau Vegetational Area (Gould 1960). The study area is also located near the eastern boundary of the Chihuahuan Desert Level III Ecoregion and with the Chihuahuan Basins and Playas and Stockton Plateau Level IV Ecoregions (Griffith et al. 2007). McMahan et al. (1984) describe the typical vegetation types within the study area as Creosote bush (*Larrea tridentata*)-Tarbush (*Flourensia cernua*) Shrub and Mesquite (*Prosopis* sp.)- Juniper (*Juniperus* sp.) Brush. TPWD Ecological Mapping Systems of Texas (EMST) (TPWD 2018b) database indicates the dominant vegetation types within the study area as Mesquite – Creosote bush Shrubland, Creosote bush Shrub, Juniper Shrubland, Hill and Foothill Grassland, Loamy Plains Grassland, Deciduous Semi-arid Shrubland, Semi-arid Grassland, and Mesquite Shrubland. Additional information on EMST ecoregions within the study area can be found in correspondence with TPWD in Appendix A. The paragraphs below provide general descriptions of the historical climax vegetative communities associated with each ecoregion. Species occurrence and density depends on location, hydrology, soil type, and magnitude of previous ground disturbance or land management activities.

The Chihuahuan Desert Ecoregion extends from eastern Arizona to the Edwards Plateau in Texas. Large flats in the bottom of these basins may contain vegetation types in this area which typically include semi-desert grassland and arid shrublands that are internally drained (Griffith et al. 2007). The flat arid floors of these basins (playas) may have saline or alkaline soils, as well as dunes and deposits of windblown sands. Lower positions in these basins may hold salt-tolerant species such as fourwing saltbush (*Atriplex canescens*), pickleweed (*Allenrolfea occidentalis*), and alkali sacaton (*Sporobolus airoides*). Alluvial fans and valleys above these basin flats are dominated by shrub species such as creosote bush and tarbush. Riparian areas are commonly invaded by saltcedars (*Tamarix spp.*) and giant cane (*Arundo donax*). Grazing of sheep and cattle are common in this ecoregion, as well as oil/gas and wind production (Griffith et al. 2007).



N
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0 25 50 100 150 200 250

Miles

Source: Gould F.W., Hoffman G.O., and Reichenthin C.A. 1960, modified

Legend

Vegetational Areas Boundary

1 Pineywoods
2 Gulf Prairies and Marshes
3 Post Oak Savannah
4 Blackland Prairies
5 Cross Timbers and Prairies
6 South Texas Plains
7 Edwards Plateau
8 Rolling Plains
9 High Plains
10 Trans-Pecos

County Boundary

Figure 2-3

LOCATION OF THE STUDY AREA IN RELATION TO THE VEGETATIONAL AREAS OF TEXAS

Bakersfield-Solstice 345-kV Transmission Line Project

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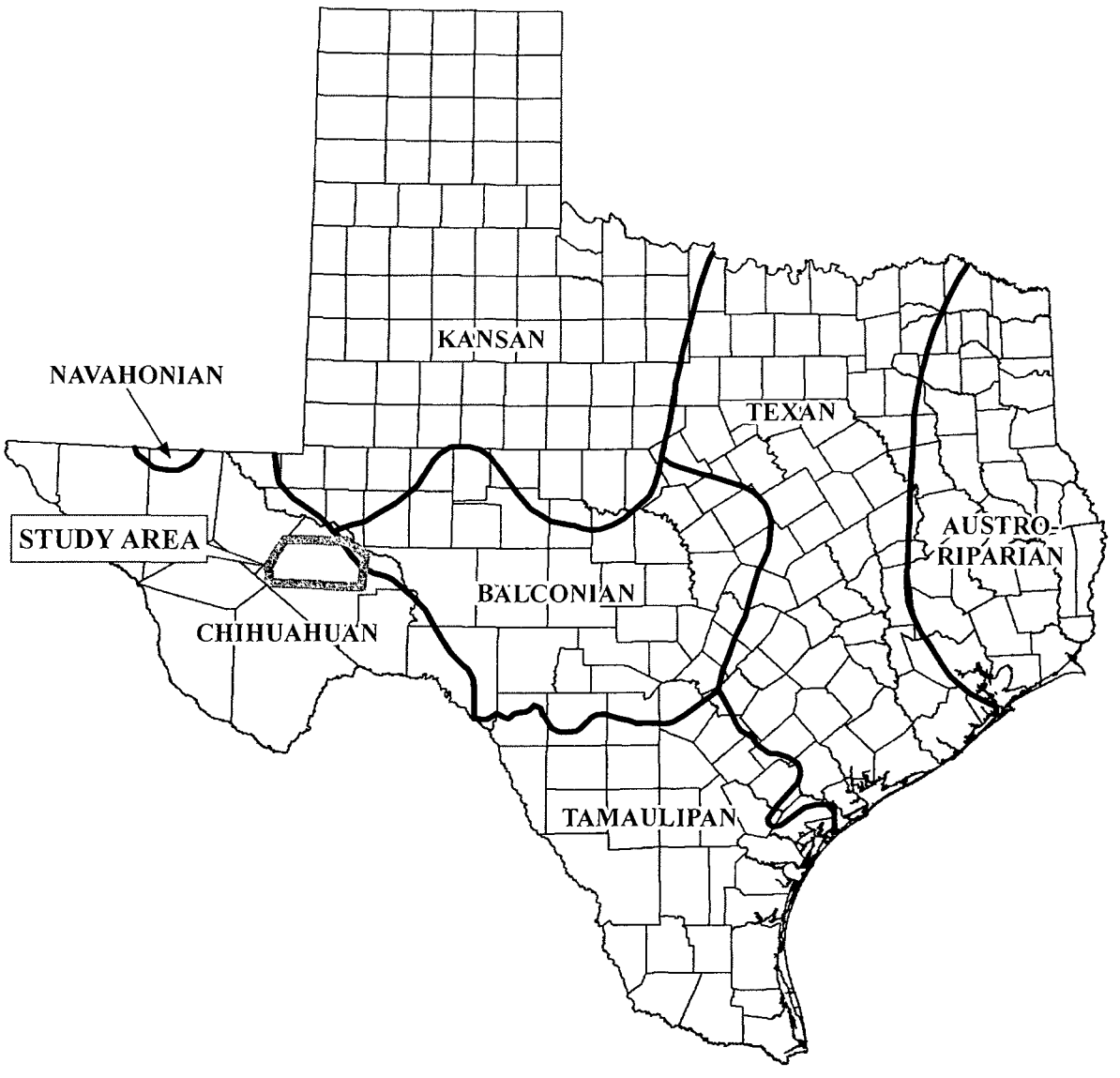
The Stockton Plateau Ecoregion is characterized by its arid elevated broken landscape, with district protruding mesas with limestone substrates. Vegetation in this area is considered transitional between habitats in the Chihuahuan Desert and Edwards Plateau. Historically, fire was an important factor to the Edwards Plateau ecosystem. With the absence of regular fires, woody juniper and mesquite vegetation has encroached on many native grasslands. Common shrub vegetation on mesas and slopes may include honey mesquite *(Prosopis glandulosa)*, redberry juniper (*Juniperus pinchotii*), and Ashe juniper (*J. ashei*). On flats and draws vegetation may include grama grasses (*Bouteloua* spp.), yucca (*Yucca* spp.), sotol (*Dasylirion* spp.), lechuguilla (*Agave lechuguilla*), broomweeds (*Amphiachyris* spp.), tasajillo (*Cylindropuntia leptocaulis*), pricklypear (*Opuntia* spp.), and burrograss (*Scleropogon brevifolius*) (Griffith et al. 2007).

2.2.5.2 Terrestrial Wildlife

The study area is predominantly located within the Chihuahuan Biotic Province, with northeast portions of the study area within the Balconian Texan Biotic Province (see Figure 2-4), as described by Blair (1950). At the time of publication, species diversity within the Chihuahuan Biotic Province was noted to include 13 different anurans (frogs and toads), one urodele (salamanders and newts), 38 snake species, 22 lizards, one land turtle, and 83 species of mammals (Blair 1950). Species diversity within the Balconian Biotic Province was noted to include 15 different anurans, seven urodeles, 36 snake species, 16 lizards, two land turtles, and 57 species of mammals (Blair 1950).



N
W E
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0 25 50 100 150 200 250

Miles

Source: Blair, 1950 modified

Legend

Biotic Province Boundary

County Boundary

Figure 2-4

LOCATION OF THE STUDY AREA IN RELATION TO THE BIOTIC PROVINCES OF TEXAS

Bakersfield-Solstice 345-kV Transmission Line Project

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Amphibian species (frogs, toads and salamanders) that may typically occur within the study area are listed in Table 2-3. Frogs and toads may occur in all vegetation types, while salamanders are typically restricted to moist hydric habitats (Tipton et al. 2012).

TABLE 2-3 REPRESENTATIVE AMPHIBIAN SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

SCIENTIFIC NAME	COMMON NAME
Acris blanchardi	Blanchard's cricket frog
Ambystoma marortium	Barred tiger salamander
Anaxyrus debilis insidior	Western Chihuahuan green toad
Anaxyrus punctatus	Red-spotted toad
Anaxyrus speciosus	Texas toad
Anaxyrus woodhousii australis	Southwestern Woodhouse's toad
Eleutherodactylus guttilatus	Spotted chirping frog
Eleutherodactylus marnockii	Cliff chirping frog
Gastrophryne olivacea	Western narrow-mouthed toad
Lithobates berlandieri	Rio Grande leopard frog
Scaphiopus couchi	Couch's spadefoot
Spea bombifrons	Plains spadefoot
Spea multiplicata	Mexican spadefoot

Source: Dixon 2013.

Reptiles (turtles, lizards and snakes) that may typically occur in the study area are listed in Table 2-4. These include those species that are more commonly observed near water (i.e., aquatic turtles) and those that are more common in terrestrial habitats (Dixon 2013).

TABLE 2-4 REPRESENTATIVE REPTILIAN SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

SCIENTIFIC NAME	COMMON NAME
Turtles	
Apalone spinifera emoryi	Texas spiny softshell
Chelydra serpentina	Snapping turtle
Kinosternon flavescens flavescens	Yellow mud turtle
Terrapene ornata luteola	Desert box turtle
Trachemys scripta elegans	Red-eared slider
Lizards	
Aspidoscelis exsanguis	Chihuahuan spotted whiptail
Aspidoscelis gularis	Common spotted whiptail
Aspidoscelis inornata	Little striped whiptail
Aspidoscelis marmorata	Marbled whiptail
Aspidoscelis scalaris	Plateau spotted whiptail
Aspidoscelis tesselata	Common checkered whiptail
Cophosaurus texanus scitulus	Chihuahuan greater earless lizard
Crotaphytus collaris collaris	Eastern collared lizard
Hemidactylus turcicus	Mediterranean gecko
Holbrookia lacerata approximans	Speckled earless lizard

TABLE 2-4 REPRESENTATIVE REPTILIAN SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

SCIENTIFIC NAME	COMMON NAME
Phryosoma cornutum	Texas horned lizard
Phryosoma modestum	Round-tailed horned lizard
Plestiodon multivirgatus	Many-lined skink
Plestiodon obsoletus	Great plains skink
Plestiodon tetragammus brevilineatus	Short-lined skink
Sceloporus cowlesi	Southwest fence lizard
Sceloporus merriami merriami	Merriam's canyon lizard
Sceloporus olivaceus	Texas spiny lizard
Sceloporus poinsettii	Crevice spiny lizard
Scincella lateralis	Little brown skink
Urosaurus ornatus schmidti	Big Bend tree lizard
Uta stansburiana stansburiana	Northern side-blotched lizard
Snakes	
Agkistrodon laticinctus	Broad-banded copperhead
Arizona elegans elegans	Kansas glossy snake
Bogertophis subocularis	Trans-Pecos ratsnake
Coluber taeniatus	Striped whipsnake
Coluber flagellum testaceus	Western coachwhip
Crotalus atrox	Western diamondback rattlesnake
Crotalus lepidus	Rock rattlesnake
Crotalus molossus	Western black-tailed rattlesnake
Crotalus scutulatus	Mohave rattlesnake
Crotalus viridis	Prairie rattlesnake
Diadophis punctatus regalis	Regal ring-necked snake
Gyalopion canum	Chihuahuan hook-nosed snake
Heterodon kennerlyi	Mexican hog-nosed snake
Heterodon nasicus	Plains hog-nosed snake
Hypsiglena jani	Chihuahuan night snake
Lampropeltis alterna	Gray-banded kingsnake
Lampropeltis gentilis	Western milksnake
Lampropeltis splendida	Desert kingsnake
Lampropeltis triangulum gentillis	Central plains milksnake
Micrurus tener	Texas coralsnake
Nerodia erythrogaster	Plain-bellied watersnake
Nerodia rhombifer	Diamond-backed water snake
Opheodrys aestivus	Rough greensnake
Pantherophis bairdi	Baird's ratsnake
Pantherophis emoryi	Great plains ratsnake
Pituophis catenifer sayi	Bullsnake
Rena dissecta	New Mexico threadsnake
Rhinocheilus lecontei	Long-nosed snake
Salvadora grahamiae lineata	Texas patch-nosed snake
Sistrurus tergeminus edwardsii	Desert massasauga
Sonora semiannulata semiannulata	Variable groundsnake
Tantilla cucullata	Trans-pecos black-headed snake
Tantilla hobartsmithi	Smith's black-headed snake

TABLE 2-4 REPRESENTATIVE REPTILIAN SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

SCIENTIFIC NAME	COMMON NAME
Tantilla nigriceps	Plains black-headed snake
Thamnophis cyrtopsis cyrtopsis	Western black-necked gartersnake
Thamnophis marcianus	Checkered gartersnake
Thamnophis proximus diabolicus	Arid land ribbonsnake

Source: Dixon 2013.

Numerous avian (bird) species are present within the study area. Bird species occurring within the study area include year-round residents, summer/winter migratory residents, and temporary seasonal migrants. TPWD Trans Pecos Ecoregion bird check (Bryan 2002) list was reviewed for potentially occurring common and abundant species within the study area, as shown in Table 2-5. Additional transient bird species may migrate within or through the study area in the spring and fall and use the area to rest and feed before continuing migration (Lockwood and Freeman 2014). The likelihood for occurrence of each species will depend upon suitable habitat and the season. Migratory birds are protected under the MBTA.

TABLE 2-5 REPRESENTATIVE BIRD SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

Scientific Name	Common Name	Year-Round Resident	Summer Resident	Winter Resident	Temporary Migrant
ACCIPITRIFORMES: Accipitridae					
Accipiter cooperii	Cooper's hawk	X			X
Accipiter striatus	Sharp-shinned hawk			X	
Buteo albonotatus	Zone-tailed hawk		X		
Buteo jamaicensis	Red-tailed hawk	X			
Buteo regalis	Ferruginous hawk			X	
Buteo swainsoni	Swainson's hawk		X		X
Circus cyaneus	Northern harrier			X	
Parabuteo unicinctus	Harris's hawk	X			
ACCIPITRIFORMES: Cathartidae					
Cathartes aura	Turkey vulture	X	X		
ANSERIFORMES: Anatidae					
Aix sponsa	Wood duck			X	
Anas acuta	Northern pintail			X	
Anas crecca	Green-winged teal			X	
Anas discors	Blue-winged teal				X
Anas platyrhynchos	Mallard	X		X	
Aythya affinis	Lesser scaup			X	
Aythya americana	Redhead			X	
Aythya collaris	Ring-necked duck			X	
Aythya valisineria	Canvasback			X	
Branta canadensis	Canada goose			X	X

TABLE 2-5 REPRESENTATIVE BIRD SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

Scientific Name	Common Name	Year-Round Resident	Summer Resident	Winter Resident	Temporary Migrant
Bucephala albeola	Bufflehead			X	
Lophodytes cucullatus	Hooded merganser			x	
Mareca americana	American wigeon			X	
Mareca strepera	Gadwall			X	
Oxyura jamaicensis	Ruddy duck			X	
Spatula clypeata	Northern shoveler			X	
Spatula cyanoptera	Cinnamon teal			X	X
APODIFORMES: Trochilidae					
Archilochus alexandri	Black-chinned hummingbird		X		
Selasphorus platycercus	Broad-tailed hummingbird				X
Selasphorus rufus	Rufous hummingbird		X		X
CAPRIMULGIFORMES: Caprimulgidae					
Antrostomus arizonae	Mexican whip-poor-will		X		
Chordeiles acutipennis	Lesser nighthawk		X		X
Chordeiles minor	Common nighthawk		X		X
Phalaenoptilus nuttallii	Common poorwill		X		X
CHARADRIIFORMES: Charadriidae					
Charadrius vociferus	Killdeer	X			
CHARADRIIFORMES: Laridae					
Larus delawarensis	Ring-billed gull			X	X
Sterna forsteri	Forster's tern			X	X
CHARADRIIFORMES: Recurvirostridae					
Himantopus mexicanus	Black-necked stilt		X		X
Recurvirostra americana	American avocet		X		X
CHARADRIIFORMES: Scolopacidae					
Actitis macularius	Spotted sandpiper			X	X
Calidris mauri	Western sandpiper				X
Calidris minutilla	Least sandpiper			X	X
Gallinago delicata	Wilson's snipe				X
Limnodromus scolopaceus	Long-billed dowitcher				X
Phalaropus tricolor	Wilson's phalarope				X
Tringa melanoleuca	Greater yellowlegs			X	X
COLUMBIFORMES: Columbidae					
Columba livia	Rock pigeon	X			
Columbina inca	Inca dove	X			
Columbina passerina	Common ground-dove	X	X		
Streptopelia decaocto	Eurasian collared-dove	X			
Zenaida asiatica	White-winged dove	X			
Zenaida macroura	Mourning dove	X			
CORACIIFORMES: Alcedinidae					
Megaceryle alcyon	Belted kingfisher			X	

TABLE 2-5 REPRESENTATIVE BIRD SPECIES POTENTIALLY OCCURRING WITHIN THE STUDY AREA

Scientific Name	Common Name	Year-Round Resident	Summer Resident	Winter Resident	Temporary Migrant
CUCULIFORMES: Cuculidae					
Geococcyx californianus	Greater roadrunner	X			
FALCONIFORMES: Falconidae					
Falco sparverius	American kestrel			X	X
GALLIFORMES: Odontophoridae					
Callipepla squamata	Scaled quail	X			
Colinus virginianus	Northern bobwhite	X			
GALLIFORMES: Phasianidae					
Meleagris gallopavo	Wild turkey	X			
GRUIFORMES: Rallidae					
Fulica americana	American coot			X	
Porzana carolina	Sora			X	X
Rallus limicola	Virginia rail			X	X
PASSERIFORMES: Aegithalidae					
Psaltriparus minimus	Bushtit	X			
PASSERIFORMES: Alaudidae					
Eremophila alpestris	Horned lark	X			
PASSERIFORMES: Bombycillidae					
Bombycilla cedrorum	Cedar waxwing			X	X
PASSERIFORMES: Calcariidae					
Calcarius ornatus	Chestnut-collared longspur			X	X
PASSERIFORMES: Cardinalidae					
Cardinalis cardinalis	Northern cardinal	X			
Cardinalis sinuatus	Pyrrhuloxia	X			
Passerina caerulea	Blue grosbeak		X		X
Passerina ciris	Painted bunting		X		X
Passerina versicolor	Varied bunting		X		
Pheucticus melanocephalus	Black-headed grosbeak				X
Piranga ludoviciana	Western tanager				X
Piranga rubra	Summer tanager		X		X
PASSERIFORMES: Corvidae					
Aphelocoma woodhousei	Woodhouse's scrub-jay	X			
Corvus corax	Common raven	X			
Corvus cryptoleucus	Chihuahuan raven	X	X		
PASSERIFORMES: Emberizidae					
Aimophila ruficeps	Rufous-crowned sparrow	X			
Amphispiza bilineata	Black-throated sparrow	X			
Calamospiza melanocorys	Lark bunting			X	X
Chondestes grammacus	Lark sparrow		X		X
Junco hyemalis	Dark-eyed junco			X	X
Melospiza lincolnii	Lincoln's sparrow			X	X
Melozone fusca	Canyon towhee	X			

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Scientific Name	Common Name	Year-Round Resident	Summer Resident	Winter Resident	Temporary Migrant
Passerculus sandwichensis	Savannah sparrow			X	X
Peucaea cassinii	Cassin's sparrow		X		
Pipilo chlorurus	Green-tailed towhee			X	X
Pipilo maculatus	Spotted towhee			X	X
Pooecetes gramineus	Vesper sparrow			X	X
Spizella breweri	Brewer's sparrow			X	X
Spizella passerina	Chipping sparrow			X	X
Spizella pusilla	Field sparrow			X	X
Zonotrichia leucophrys	White-crowned sparrow			X	X
PASSERIFORMES: Fringillidae					
Haemorhous mexicanus	House finch	X			
Spinus pinus	Pine siskin			X	X
Spinus psaltria	Lesser goldfinch		X		X
PASSERIFORMES: Hirundinidae					
Hirundo rustica	Barn swallow		X		
Petrochelidon fulva	Cave swallow		X		
Petrochelidon pyrrhonota	Cliff swallow		X		
Riparia riparia	Bank swallow				X
Stelgidopteryx serripennis	Northern rough-winged swallow		X		X
Tachycineta bicolor	Tree swallow			X	X
Tachycineta thalassina	Violet-green swallow		X		
PASSERIFORMES: Icteridae					
Agelaius phoeniceus	Red-winged blackbird	X			X
Euphagus cyanocephalus	Brewer's blackbird			X	X
Icterus bullockii	Bullock's oriole		X		
Icterus parisorum	Scott's oriole		X		X
Icterus spurius	Orchard oriole		X		
Molothrus aeneus	Bronzed cowbird		X		
Molothrus ater	Brown-headed cowbird	X	X		
Quiscalus mexicanus	Great-tailed grackle	X			
Sturnella magna	Eastern meadowlark	X		X	
Sturnella neglecta	Western meadowlark	X		X	
Xanthocephalus xanthocephalus	Yellow-headed blackbird				X
PASSERIFORMES: Laniidae					
Lanius ludovicianus	Loggerhead shrike	X			
PASSERIFORMES: Mimidae					
Mimus polyglottos	Northern mockingbird	X			
Toxostoma crissale	Crissal thrasher	X			
Toxostoma curvirostre	Curve-billed thrasher	X			
PASSERIFORMES: Motacillidae					
Anthus rubescens	American pipit			X	X
PASSERIFORMES: Paridae					